Ultralight Backpacking Secrets

(And Wilderness Survival Tips)

By Steve Gillman

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A Short Introduction

The first time I started to hike fifteen to twenty-five mile days without blisters I was sold on ultralight backpacking. You may already be a "convert" too. If so, you can skip the first couple chapters.

However, be sure to read the ***Ultralight Backpacking Quick Tips*** found in each chapter. This is where you'll find many of the "secrets" you won't see in other backpacking books. Why do I have so many tips on edible plants, wilderness survival, and other things that seem only indirectly related to ultralight backpacking? For the following reasons:

1. Knowing which plants can be used for food, medicine or survival tools makes backpacking more interesting. Like myself, some of you may love to feast on numerous different berries while hiking in the mountains. You may also like to know what the plants and things around you can be used for.

2. Knowing just a little bit about how to survive out there makes going light even safer. A compass can be lost, and your food can be stolen by animals. A wet sleeping bag can lead you dangerously towards hypothermia - unless you know how to deal with these "survival" problems.

3. I want this book to be different from other backpacking books. To justify using the word "secrets" in the title, there should be some knowledge and ideas here that aren't found in the other backpacking books out there.

This book is weak in some areas. I have never had serious injuries when backpacking, so I have not been motivated to learn and pass on the latest first aid techniques. Since I have no desire to cook much when backpacking, you won't find recipes here either. My feeling is that the purpose of a book is not to say everything there is to say about a subject, but to say something *new*. I am certain you will learn some new things here.

Steve Gillman

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Chapter One

Why Ultralight Backpacking?

Anyone who has lugged a fifty-pound backpack (or even a forty-pound one) down the trail can understand why the desire to lighten the load. Backpacking is not about proving how tough you are, but about enjoying yourself in the wilderness. Certainly challenges can add to the experience, but excessive suffering doesn't make for a better experience.

Weight, then, matters. However, ultralight backpacking isn't just about carrying a little less weight in order to be more comfortable. It really is a whole different approach to backpacking. To see why, let's look at the differences between traditional and ultralight backpacking.

Traditional Backpacking Versus Ultralight Backpacking

Comfort

Okay, comfort does matter, and hiking with a heavy pack is clearly more tiring.

A light load in that backpack means you may just have more energy at the end of the day, and you may enjoy the trip more. Some people think you sacrifice comfort to go light, because you bring fewer things. This is a misunderstanding. After you cut the weight on your back by twenty-five pounds, you can add back what *you* need to be comfortable.

Hassles

Ever see backpackers helping each other put their packs on? I also see hikers taking breaks with their backpacks on, because it is just too much hassle to take it off and put it on again. Maybe these are clues. Maybe the packs are too heavy. Putting on and taking off a heavy backpack is a hassle.

Ultralight backpackers can swing the pack up and onto their shoulders with little effort. In fact, I often sling my pack from one shoulder for a time, just to let my back cool off. Don't try that with a forty-pound load.

Freedom

I often see packs sitting in the rocks near mountain peaks. Why? The backpackers don't want to carry that heavy load to the top. Of course this means they have to come back the same way, in order to get their backpacks. A heavy pack also means you may not feel like running up that hill, just to see what is there.

With a light pack, you can run up any mountain or hill, and descend by another route if you wish. A light pack never has to be left behind, so you get more freedom.

Injuries

Twisted ankles, sore muscles, blistered feet, and back and knee problems are just some of the common consequences of too much weight on your back. Good balance is trickier with a heavy pack as well, meaning stumbling or falling is more likely.

Many of these common injuries are less likely when you are ultralight backpacking. The light load easier on your body, and makes it easier to keep your balance. I stopped getting blisters when I first started lightweight backpacking.

Speed

A heavier backpack means slower progress. This isn't always a problem, but it does mean less access to wild places - you can't go as far on your three-day trip. It can also mean less time to for enjoyable activities, like a swim in a mountain lake, or a relaxing evening in camp - because more time is spent just getting to where you are going.

I found that a eight hours of hiking became six once I lightened the load. I also found that I enjoyed the hiking part so much that twenty mile days were easy.

Expensive

This is one area where traditional backpacking has some advantage - but not much.

Lightweight sleeping bags are expensive, but almost everything else needed for ultralight backpacking can be found for the same price or cheaper than traditional gear. Many high quality lightweight backpacks, for example, are less than a hundred dollars. Closeouts on running shoes mean paying less than for any good hiking boots.

Ultralight Backpacking Quick Tips

A cheap and easy and light seat cushion can be made from a sleeping bag pad. Just take an old basic blue foam pad and cut a square about 12 inches square out of it. This will weigh about one ounce (3/8" pad) and make a nice waterproof seat when you want to sit on a wet rock, log or on the ground. Put against your back inside your pack and it will also pad you from any sharp or clunky items.

Need something to tie things together? The small roots of spruce trees (genus picea) can often be dug by hand near the surface of the ground. They have been historically used for binding all sorts of things, as well as for sewing together birch bark canoes.

Cold wind may chill the front of your body, even while your back is hot and sweaty. If this happens, try putting your jacket on backwards, and leaving it opened. This keeps your back cooler while protecting you in front.

Extras

It is true that if you don't think about weight much, and you have a big frame-pack to carry it all, you can bring whatever you want to make a trip enjoyable. However, it is a misconception that ultralight backpacking has to mean sacrificing too much.

Go ahead and bring your favorite camera! Your lighter load means you can stop to use it more easily. Leave behind things you don't need, bring a lighter backpack, tent, and sleeping bag, and you can more easily bring that telephoto lens or whatever is really important to you.

Risks

More injuries, and the inability to move quickly when a storm is coming or an emergency requires you to get to a road, means that backpacking can actually be more dangerous with a heavy load. Add to that the possibility of bad decisions due to tiredness.

There is a misconception out there that ultralight backpacking is less safe than traditional backpacking. This just isn't so.You can still bring all the safety items; a sleeping bag, first aid, shelter, water purification - you just bring lighter versions. A light load means faster response to iffy situations, like a coming storm or a hike out to get help in crisis.

Note: Safety is largely a matter of knowledge and experience. For example, an expert survivalist will always be safer with no shelter than a neophyte with the best tent. Learn how to use you equipment properly, and tricks like reading the sky for coming storms - then you can go lighter *and* safer.

Why Ultralight Backpacking?

It should be clear now that ultralight backpacking can give you more freedom, more comfort, more safety, more enjoyment and less suffering than traditional backpacking. Is it for you? Ask around. I haven't ever met a person who has tried lightweight backpacking for a while, and then gone back to a heavy load.

This isn't to say it is for everyone. Ankle problems may require heavy hiking boots. Bad habits may require a big pack to satisfy them. Still, even those who need a pillow and big rectangular sleeping bag can find these in lighter forms.

When you try ultralight backpacking for the first time, you'll probably feel a sense of liberation. I know that I did. Walking with my eleven-pound pack, past overloaded backpackers struggling up steep hills, I remembered being in their place, and I knew I was enjoying myself more with a lighter load.

Key Points

1. Ultralight backpacking is easier on your body.

2. It doesn't mean sacrificing anything important.

3. It is safer than traditional backpacking.

4. It costs about the same if approached properly.

5. It gives you more freedom.

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Chapter Two

Light Backpacking - Getting Started

Are you ready for light backpacking? If you typically backpack with forty pounds or more on your back, try the following experiment. Put ten or fifteen pounds into your pack and walk around a little. Does it feel better than carrying a heavy backpack? If so, perhaps you are ready to become an ultralight backpacker.

Sometimes people think that cutting their pack weight is just about lightening the gear. That's a good start. In fact, here are three steps to get started:

Step One: Buy a light pack.

Step Two: Buy a light shelter.

Step Three: Buy a light sleeping bag.

Cutting the weight of the "big three" backpacking necessities is the surest way to reduce that weight. My first 13-ounce backpack replaced an 88-ounce one. I had a 72-ounce tent before buying a 18-ounce tarp shelter. I thought my 52-ounce sleeping bag was light until I got my *warmer* 17-ounce down bag.

Total weight savings? The big three used to add up to over 13 pounds. Now they total 3 pounds. You can spend all day shaving the handles of toothbrushes and cutting pencils in half, and you'll never get a reduction in pack weight of ten pounds. Start with the "big three." There will be more on these three in other chapters.

Light Backpacking Rule #1

A lighter pack, bag and shelter is just a beginning, though. The most important thing you can do to lighten the load is to follow rule number one: **Consider each item carefully**. Ask and answer the following questions:

Do you really need to bring it?

What would happen if you didn't bring it?

Is the value it adds to the trip worth the weight?

Can it be used for more than one function (ex: tarp and rain poncho)?

What lighter alternative can you bring?

Better to be ruthless the first time you make your packing list. Then, once you've really cut down

your weight, you can always add back one or two luxuries. In this way, you'll identify what really is important to you on a backpacking trip - and leave the excess toys home.

Ultralight Backpacking Quick Tips

Keep fires small and you'll spend less time collecting firewood. Just get closer for warmth. If you are also using the fire for possible signaling in an emergency, you can still keep it small, but keep a pile of brushy branches nearby to add if a plane goes by.

Digestion is more difficult at high altitude. This seems to be especially true for fats and proteins. If you are headed above 12,000 feet, you may want to save your crackers and other simple carbohydrates for snacking on top of that mountain.

In hot weather, soak your hat in every stream or water source you pass. A wet hat is like having a little air conditioner on your head. A wet bandana around your neck helps too.

How To Become An Ultralight Backpacker

Step 1: Read and learn.

Step 2: Consider what you truly need and make a new packing list.

Step 3: Buy lighter backpacking gear and clothing.

Step 4: Condition your body.

Step 5: Practice using your light backpacking gear and knowledge.

Step 6: Find better ways as you learn what works for you.

Light Backpacking Using Money

Money is the easiest way to reduce weight. There is some incredible stuff out there. Don't have much money? There are *many* options. For example, a decent rain jackets cost a *sixth* of the great ones, and weighs almost the same. Fortunately, money is not the only route to a lighter pack weight.

Light Backpacking Using Knowledge

With knowledge, you can stay dry with a tarp instead of a tent. You can safely carry only a pint of water by filling the bottle at every stream - if you know the area. You can eat a belly full of berries instead of carrying fruit into the wilderness. Knowledge lets you backpack with less weight *and* more safely.

Key Points

1. You'll save the most weight on the "big three" (backpack, shelter, sleeping bag).

2. Carefully considering each item packed is the surest way to cut weight.

3. Money well-spent is the easiest way to reduce pack weight.

4. Knowledge can also be used to reduce pack weight.

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Chapter Three

Finding A Good Ultralight Backpack

A good ultralight backpack weighs less than three pounds. This is my own rule, but it is reasonable, because there are plenty of good packs under three pounds for most basic backpacking trips.

My own ultralight backpack is a ten-year-old GoLite Breeze. It weighs 13 ounces, has a capacity of 2900 cubic inches (plus more in the extension collar), and is more comfortable than any frame pack I've had - of course I don't carry more than 16 or 17 pounds in it. I've used it on two trips to Ecuador (from rain forest to 20,600 feet), as well as in Michigan, Colorado, Tennessee, California, Montana and North Carolina. If packed right, it qualifies as carry-on when I fly (I don't check luggage).

This isn't a sales pitch (I don't think they sell this model any longer). The point is that a good ultralight pack can be very light and still hold up to years of use in many different climates and terrains.

Frame-Less Ultralight Backpacks

The lightest backpacks don't have frames. I just use a sleeping pad for a "frame," as is often recommended. To do this, take a cheap closed-cell pad, and cut it across, halfway through the foam, on opposite sides. You can accordion (fold) it into a three layer thick (2 cuts)or four layer thick (3 cuts) back-padding frame. Place the pad in the pack first, where it will be against your back, and load everything in behind it.

Other Backpack Options

I've used an 8-ounce duffel bag as a backpack. It has no pockets to organize things, but it has lots of room, and it is very tough. Actually, the full-length zipper makes it so easy to see everything that organization isn't very important.

If you have an old backpack frame, you can make a simple, cheap ultralight backpack. Remove the old pack, and tie a plain nylon duffel bag to the frame firmly, with the zipper facing out. You could also attach it using small bungee cords. I used an old aluminum frame that still had straps and a waist belt, and spent just $15 for the duffel bag. The result was an external-frame backpack that held a lot and weighed just two pounds (Why can't the gear makers do this?).

Thrift stores sometimes have cheap backpacks. You may just find day packs, but you never know. I've seen old aluminum frame packs, and it occurred to me that for a few dollars I could just toss the pack, and use the frame with a duffel bag, as described above.

Ultralight Backpacking Quick Tips

Need emergency clothing or blankets? The bark of the western red cedar (thuja picata) can be peeled easily from the tree (on one side so as not to kill the tree). The softer inner bark is then separated out and used for weaving rough clothing, blankets, ropes and baskets.

Cheese can actually do just fine without refrigeration for a day or two if it isn't terribly hot. Take cheddar and other "hard" cheeses, eat them by the second day, and keep them cool if possible. Individually wrapped string cheese sticks are also a nice snack that will still be good on the second day of your hike.

Want to make better time when hiking in hills or mountains? Often you don't really need a total rest stop, but just a break from hiking uphill. If you see that a level stretch is coming, push on to that and you'll get the relaxing walking you need, without losing the time on a rest stop. Limit rest stops to long uphill stretches and other times when you really need them.

To find cheap backpacks, you can also shop online. Try Ebay.com, or go to backpacking forums or other outdoor forums that allow people to post their gear for sale, like www.whiteblaze.net. The nice thing about forums is that you can easily ask questions about the pack.

I have seen ultralight backpacks at rummage sales. Scan the classified ads for any mention of outdoor gear, then call to see if they have a backpack you might want. Maybe you can buy it before the sale starts. If not, shop early, and negotiate.

I once bought a six ounce backpack at WalMart. You didn't know they sold ultralight backpacks? I'm sure they didn't know either. It was a day pack or pack for school, but with 1200 cubic inches, I can use it for summer overnighters - and it only cost $4.

Perhaps a decent-sized backpack could be made at home that weighs less than 8 ounces. A simple one, without extra pockets, made from light nylon material - how could it weigh much? I won't do it (I don't like sewing), but it could be done.

How Light?

I saw an ultralight backpack being sold that weighed under four ounces. No, that's not a typo. It was 3.7 ounces, to be precise. It was designed to hold up to fifteen pounds, and looked a bit fragile. This is the lunatic fringe of ultralight backpacking. Of course, I have also gone on short trips carrying just a bivy sack, bottle of water and a few granola bars in my jacket pockets. Any other ideas out there?

Note: Options change too quickly to keep a book up to date with specific products. You can find more current information and links to the best suppliers at http://www.TheBackpackingSite.com.

Key Points

1. A good ultralight backpack should be under three pounds.

2. Some backpacks are as light as four ounces.

3. You can make a lightweight pack using a duffel bag and/or an old aluminum frame.

4. There are many ways to find a cheap ultralight backpack.

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Chapter Four

Ultralight Backpacking Tents

How much should ultralight backpacking tents weigh? The pup tents I used as a child was about three pounds. Based on this, I figure - with all the new materials available - it should be possible to make one-man and even two-man tents under three pounds without all the interior condensation problems of the old tents.

There are a few backpacking tents that meet my standards, as well as tarps, bivies and other options. Here are some of the specific design features, and their advantages and disadvantages.

- Single wall waterproof-breathable tents. These tend to be as heavy as the the ones with rain-flies. Some users report that they still have condensation problems too. They may be simpler to erect, though.

- Single wall waterproof tents. The newest designs are not like the old pup-tents. They deal with the interior condensation problem by having lots of ventilation. A forward sloping front, for example can be a screened opening to allow air flow, while still keeping rain out in all but the windiest storms.

- Floor-less tents. The advantage here is usually quick set-up, in addition to the weight savings. Some designs let you use trekking poles instead of carrying the extra weight of tent poles. You need a groundsheet, of course, but these can be light (and disposable) plastic to keep the weight down.

- Hanging tents. Some designs let the tent be hung from a tree limb, so you can save the weight of tent poles. It can sometimes be difficult to find a good branch for this, so you may want to be sure you can use a stick or trekking pole as an alternative.

- One-man versus two-man tents. Of course a one-man tent will usually be lighter. On the other hand, if you will mostly be backpacking with a friend, a two-man tent should weigh less per-person. Also consider how much time you will spend in the tent - space matters if you'll be waiting out the rain for hours on end.

- Aircraft aluminum poles. These are some of the lighter tent poles out there - certainly lighter than the shock-corded fiberglass ones.

- Four-season versus three-season tents. This is a somewhat artificial distinction unless you are going to do some extremely cold backpacking. I have even tarp-camped when it snowed. Just be sure that you can use the tent for the conditions you expect to be in.

- Lamp hangers, interior pockets, and other features. While I generally don't like to pay in dollars or

in extra weight for special features, sometimes they are worth it. If you like to read in the tent, a loop at the top to hang a flashlight from is a real advantage.

Ultralight Backpacking Quick Tips

A good fungus for starting fires grows on birch trees. Look for black, lumpy growths on the trees and break off a piece. The inside is orange to brown. What makes this particularly useful is that it can be ignited from a spark, to create a coal that can be blown into a fire. You can also use this fungus to carry a coal with you, for quick fire making at the next stop.

Sore throat or cough? Tea made from the boiled new needles and/or sap of spruces (genus picea) is used to treat both. It also contains a significant amount of vitamin C.

Breath through your nose when hiking. It involves your diaphragm more (you'll notice your abdomen expands more than with mouth-breathing), meaning more air makes it to the bottom of your lungs for better efficiency. Less body moisture is lost when breathing through the nose as well, which is important if you have limited water to drink.

Some Questions To Ask

- Are you very claustrophobic? A large tent or even a tarp may be better for you.

- How tall are you? If the length of the tent is within a few inches of your height, you *will* be touching the walls. This probably means getting wet from the condensation.

- Do you simply sleep in your tent, or spend hours in it reading and talking? Total floor space is more important if you plan to spend a lot of time in your tent.

- Will you be backpacking in rainy areas? You tend to get what you pay for with tents. A cheaper tent may shrug off a gentle shower, but leak during a sustained downpour.

- Do you value faster set-up or lighter weight more? Some tents set up quickly, which can be nice if it is getting dark or about to rain. It might even be worth a few extra ounces.

- How much have you budgeted for a tent? If it isn't much, be sure to read the chapters on tarps and bivy sacks too.

Do You Really Need A Tent?

Maybe you can get by with a tarp or a bivy sack. It depends on the type of trips you take, the terrain and climate you'll be in, and your own needs for comfort. What you need is a lightweight backpacking shelter that you enjoy using and works for you. This may mean owning a couple different shelters for different purposes.

Even some of us who primarily use tarps like to use a good backpacking tent from time to time. Tents have obvious advantages. They usually keep you out of the weather more effectively. They give you more protection from insects. They give you more privacy. It will usually be warmer in a tent than under a tarp, because it is harder for the wind to blow away your body heat.

That last advantage can become a disadvantage when it is a hot summer nigh, of course. They can also take some time to set up. The primary disadvantage, though, is that the lightest backpacking tent is heavier than either tarps or bivy sacks.

So should you carry a tent or something else for a shelter? It's a matter of place, season and personal preference. I happen to love the open feeling of life under a tarp - at least until the mosquitoes come out. If it buggy and windy and rainy, I would prefer any of the good ultralight backpacking tents.

Key Points

1. A good ultralight backpacking tent should weigh three pounds or less (one-man tent).

2. You need to carefully consider how you use a tent in order to buy the right one for you.

3. You need to think about the climate where you'll be using the tent before buying one.

4. There are other shelter options besides a backpacking tent.

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Chapter Five

Backpacking Tarps

The primary advantage of backpacking tarps, when compared to tents, is weight. My own ultralight tarp weighs 16 ounces - with the strings. There are backpacking tarps that weigh as little as 7 ounces, and a few that are even lighter than that (although they are probably too small for my tastes). Almost any backpacking tarp you can buy will be lighter than the lightest tents out there.

Other advantages? They are cheaper. They give you room to move. You can easily look around. You can quickly take down a tarp when you're ready to go. When it's wet, you can shake it off and stuff it in an outside pocket of your backpack. I prefer using a tarp over a tent - most of the time.

Using Backpacking Tarps

Backpacking tarps work well if used correctly. Use the following guidelines:

- Pitch the low side towards the wind.

- Keep all the sides low if a storm is coming.

- Try to evenly tighten the guy lines.

- Use trees, trekking poles, rocks, and anything else that helps.

- Pull the tarp tight on all sides.

This last tip keeps the tarp from flapping around in the wind too much. A flapping tarp can loosen the strings or even cause tears in the fabric. If you haven't used backpacking tarps before, experiment and practice until you know how to quickly set up in several different environments.

Of course you can bring lightweight stakes for setting up the tarp, but I prefer to use sticks and trees and rocks. That way there is less to carry. I've always found enough things to use, even up high on the alpine tundra.

You might have to treat the seams with a sealant when you first buy your tarp, or at some point later. Seam-sealer is available anyplace that sells tarps and tents.

You'll also need string or cord of some sort, for tie-downs. Put varying lengths on the tarp. That way you can untie them and use the long ones where your need them. Occasionally that one tree will be a little too far away for a short string.

Ultralight Backpacking Quick Tips

If you have a very breathable rain jacket, you can also use it as your only wind shell. Leaving your other jacket home will save weight. Finding dual-purpose items is always a great way to save weight when backpacking.

Lost in the woods with no food? The inner bark (the soft white part) of pine trees (genus pinus) is edible. Palatability is another matter, and varies from species to species. I have found white pine to be tolerable. Strip some bark off the tree, scrape the inner bark from the rougher outer layer, and boil it for best digestion.

In cold weather, coat your feet with antiperspirant for several days before a backpacking trip. This will stop them from sweating too much. This means drier, and therefore warmer feet.

Groundsheets

Some backpackers carry heavy nylon or plastic groundsheets, but this isn't necessary. My own groundsheet is a 2-ounce piece of plastic, 4 feet by 7 feet. It's an opened-up giant garbage bag, and I've used it for a week straight in the Rockies. It's cheap and easy to replace. Any little holes that develop are not enough to let moisture through from the ground.

Whatever you choose for a groundsheet, lay out your bag on it, to be sure you'll have room. You don't want the end of your sleeping bag touching the wet ground in the middle of the night. Also, the tarp is too big, it will catch rain out near the edge of the tarp, and funnel it back towards you.

Backpacking Tarps and Mosquitoes

Mosquitoes may be the biggest reason many ultralight backpackers refuse to use a tarp. Using insect repellent is only a partial solution. Another solution is to use the tarp only in areas that aren't too buggy, and bring a tent otherwise. A head net weighs just an ounce, but you still need to keep the rest of your body covered - not pleasant when it's warm. Pitching camp where the bugs are blown away (up high, for example) has worked well for me.

There is one other solution. There are mesh "tents" you can pitch under your tarp. I have seen one with a floor built in that weighs 1 pound 7 ounces. In combination with a 7-ounce tarp, you're still under 2 pounds for a shelter, and you don't have to bring a head net or groundsheet. This way you also have the option to just bring the tarp when there are no bugs.

Ultralight backpacking tarps, by the way, weigh less than 20 ounces. This is my own standard, but it seems reasonable.

Tarp Poncho Combos

There are rain ponchos that are designed to be used as a backpacking tarp as well. Some of these are relatively light (under a pound). It is always worth looking into any dual-purpose items to save weight when backpacking.

Tarps can also be made from plastic painter's drop cloths, if you are just going out for an "overnighter" in an area without much wind.

Key Points

1. Tarps are lighter and sometimes simpler to use than tents.

2. You need to use an appropriate-sized groundsheet with a tarp.

3. You should practice setting up your tarp before going too far into the wilderness.

4. A good lightweight backpacking tarp weighs less than 20 ounces.

5. The problem of mosquitoes has some solutions, but a tent is sometimes the best answer.

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Chapter Six

Using A Bivy Sack

Bivy sack is common English now for "bivouac sack." This is the most basic shelter you can use for backpacking. Essentially a waterproof bag you sleep in, they were originally used by soldiers and climbers who had to spend the night in unexpected places without a tent.

Take a look in a store, a catalog or online, and you will see that a good bivy sack can be both claustrophobic and expensive. The solution for the first problem is simply to get used to it, or use some other type of shelter. The second problem I have a better solution for.

A Cheap Lightweight Bivy Sack

Not wanting to spend $200 for a nice bivy, I bought an "emergency bivy" for $20. This was basically a "high tech" plastic bag. On a rainy night in Michigan, with a small umbrella over my head, I tried it

out. I tried not to breath in the bag. Still, I figured I would be soaked by the the condensation from my own perspiration, like all the books warn. However, in the morning I was surprisingly dry.

This got me thinking. When I later lost the bivy, I decided not to pay $20 (or $200) to replace it. Instead, I duct-taped two extra large garbage bags together. I cut open one end, and I had a three-foot by seven-foot bivy sack.

It weighed four ounces - lighter than anything commercially available. Even my "emergency bivy" had weighed almost twice as much. Of course the bivy sacks you buy are tougher, but so what! I use my four-ounce bivies as disposables. They cost less than a dollar each, so it doesn't hurt to throw them away at the end of a trip.

In fact, they are good for a week-long backpacking trip if I am careful. The small holes that may wear through in the bottom won't allow moisture in unless you are laying down in standing water. There's your lesson on making an ultralight bivy sack. Four ounces, and it will fit in your pocket. (This isn't my only disposable lightweight backpacking gear by the way.)

A bivy sack is best for in dry environments. However, since I used mine in Michigan without any real problems, I think you can use almost anywhere - at least for short trips. This is especially true if you know how to properly use one.

Ultralight Backpacking Quick Tips

Pocket lint makes a good tinder for fire-starting. By the way, this is why so many fires start in peoples clothes dryers. A spark will usually take hold in lint and can be blown into a flame (be sure to have kindling and firewood ready).

It's nice to have a cold drink when hiking in hot weather. One way to do this, at least for the first day of the hike, is to freeze your water bottle or sports drink before you go. It should take most of the day to thaw if you keep it wrapped in clothing in your pack. It is best to have another unfrozen water bottles too. I have had to sit there thirsty more than once while staring at my frozen water, waiting for it to thaw.

Pack your rain gear where you can easily get at it. You don't want to be digging through the backpack in the rain.

How To Use A Bivy Sack

Whether you make one or buy one, the problem with bivy sacks isn't getting wet from the rain. What will get you wet will be the condensation on the inside of the sack. Even those that claim to be waterproof *and* breathable can't handle much moisture.

One key to using bivy sacks, is to bring as little moisture into them as you can. If you are sweaty, wait until you cool off before entering the sack. If you have damp clothes, leave them outside the sack. Put them in a plastic bag to keep them from getting wetter if rain is coming.

Don't breath inside a bivy sack. This is the fastest way to make the inside wet and uncomfortable. Some bivy sacks have a screened pop-up canopy that will also keep the rain off your head. Otherwise, you have to carry a small umbrella, use a piece of plastic over your head, put your head

under a ledge or tree, or just let it get wet.

Check inside the sack every morning. If there is moisture, turn it inside-out to dry during a break at some point in the day.

Some bivy sacks can be used with either side down. If yours is this way, be sure to always use it with the same side down. Small holes will likely wear through the fabric in time. These will allow rain in if they are on top, but usually won't let much moisture seep in from the ground - so keep the damage to one surface of the bivy sack.

You will sometimes get your clothes and sleeping bag damp from sleeping in a bivy sack. If it isn't raining or snowing, you'll usually dry out in a quickly once you start hiking. You should also get in the habit of taking a break to lay your sleeping bag in the sun to dry out any dampness. I recommend against using a bivy sack with a down sleeping bag (they lose more insulating ability when damp).

Why Use A Bivy Sack?

The biggest advantage of a bivy sack may not be how light they are. In fact, most of the ones you'll see in outdoor catalogs weigh more than my tarp/groundsheet combination. They are a light shelter, but a good bivy sack has one other big advantage: It is simple. Unroll it and climb inside - you can't have a faster set-up than that.

Key Points

1. Bivy sacks are expensive, but there are cheaper alternatives, like making one.

2. A bivy is the simplest, and one of the lightest backpacking shelters.

3. Moisture build-up is a real problem if you don't properly use a bivy sack.

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Chapter Seven

Sleeping Bags

There are sleeping bags out there for everyone, and we are all *so* different. Some people can't sleep in a mummy bag, while others can sleep in anything. Some backpackers won't be gentle enough with a fragile high-tech bag, while others can make their gear last forever. Ray Jardine swears by hand-made sleeping quilts, but many of us have neither the time nor the skill to sew one.

Which sleeping bag is best? There will never be one answer. Not only are we all different in our personal needs, but different places and weather mean we may need two or three different bags. Let's look at some of the options.

Down Sleeping Bags

Down is still the lightest insulation. Backpackers have been waiting for decades for a new synthetic material that, ounce-for-ounce, insulates as well as down, but it hasn't happened yet. Down bags are also much more compressible than the synthetic ones, meaning they take much less space in the pack. A down sleeping bag can be rejuvenated by throwing them in the dryer with a shoe to "fluff" them up. I've seen a 30-year-old down bag with virtually all of its original loft after a treatment like this.

It sounds like a down bag is the ultimate lightweight sleeping bag, doesn't it? It is - in the right place and used the right way. Down's primary drawback is that it is almost worthless when wet. Unlike synthetic fill bags, down bags lose almost all of their insulating ability when wet. If torn, they also lose their insulation more easily.

The point here is to be careful how you use a down bag. Once, during a week of rain, camping under a tarp in the Rockies, I managed to keep my down bag dry. I had to be very careful, but obviously it can be done.

How light are down sleeping bags? My down bag weighs just 17 ounces, or 19 ounces with the stuff sack. A stuff sack isn't always necessary - I can stuff the bag directly into my pack or put it in a half-ounce bread bag.

The zipper only goes half-way down (to save weight). The bag appears fragile, and I have babied it over the years, but it may be tougher than I thought. I've used it from sea-level to 16,000 feet in all types of weather (I camp under a tarp much of the time). It still has all of its loft and appears new. It's a mummy bag, but it has always been comfortable for me (I'm 6'3", 165 pounds). Though it;s only rated down to 40 degrees, I have been warm in it below freezing many times.

The lofting ability of down (and therefore its warmth per ounce) is measured by its fill power rating. A 650 fill power or above is a minimum for a decent bag in my opinion. The number indicates the amount of actual down, as opposed to feather and quill. To be more precise, it measures the cubic inches that an ounce of a particular batch of down will fill.

Synthetic Sleeping Bags

A good synthetic sleeping bags will take abuse well, and keep insulating even when wet. Well-designed ones are getting close in weight to down bags. They do still take a lot more space in your pack, however. The insulation also breaks down and loses its loft after a few years.

Down is lighter and more compressible. Synthetic bags are so worry-free - at least while they are relatively new. It is truly a tough choice. If you regularly get wet, go with a good synthetic bag.

Ultralight Backpacking Quick Tips

If the grommets break on your tarp, or if you are using a piece of plastic or nylon that doesn't have any, you can still tie lines to it. Take a small rock and push it against the plastic, grabbing it from the other side. Tie the cord around this and it should hold just fine. In fact, done right, this is more reliable than a grommet in my experience.

For emergency night travel, you can make a simple torch. Use the pitch from pine trees (genus pinus) wrapped around the top of a stick with strips of cloth, or just smeared on it. Wounded pines often have large gooey masses of pitch on their trunks. Hot pitch will drip, so hold the torch away from you. This sap is also a good fire starter.

Most tents don't need a groundcloth. If you use one, it should be slightly smaller than the tent bottom, or it will catch rain and hold it against the tent. If it is too large, use the groundcloth inside the tent instead.

Other Sleeping Bag Considerations

- There are three basic styles: mummy, semi rectangular, and rectangular. They get less confining in that order. They also get heavier, meaning less warm, ounce-for-ounce, in that order. Use a mummy if you are comfortable in one.

- You generally get what you pay for with sleeping bags. The best are expensive. My own down bag cost over $200 almost ten years ago.

- Make sure the bag is long enough for you. This is especially important with mummy style, because your head needs to be inside the hood of the bag to use it properly.

- Try bags with a left-zipper and right-zipper, to determine which is more comfortable for you.

- If you plan to zip your bag together with your partners, one will have to be a right-zipper and the other a left-zipper.

- A two-way zipper lets you ventilate your feet, so you don't sweat into the bag as much.

- A differential cut, meaning the inner lining is smaller than the outer shell, allows fuller lofting of the insulation, which means more warmth.

- An insulated draft collar can help to seal in the warmth and keep out the cold around your neck and shoulders.

- Ripstop nylon, polyester, or other ripstop materials are the standard for good sleeping bags. The "ripstop" feature is especially important with the more fragile super-light fabrics.

- On a mummy bag, a shaped hood should cup the head naturally.

- A draft tube covers the zipper to seal out cold air usually provides enough additional warmth to justify the weight.

- A water-resistant outer shell is a good idea, especially if you will be sleeping under a tarp.

- Dark linings absorbs heat from the sun's rays better - helpful if you need to dry out your bag.

How Light?

You should be able to find good down bags rated to about freezing, which weigh two pounds or less. A good synthetic fill bag rated to freezing should only weigh five or six ounces more. Rated to zero Fahrenheit (-18 degrees Celsius), there are down bags that weigh less than four pounds, and synthetic bags that are a little over four pounds.

Other sleeping bag options - both lighter and cheaper alternatives - are discussed in the next chapter.

Sleeping Bag Pads

A good sleeping bag pad is necessary if you want that sleeping bag temperature rating to be meaningful. Without a pad, the ground will conduct away much of your body heat. The bag may insulate you well above, but you are laying on and crushing that insulation below, putting your shoulders, hips and more against the cold ground - or against a good pad.

A Light Pad

Want a four-ounce sleeping bag pad? Buy a plain blue closed-cell foam pad from any backpacking supplier or department store. It should cost you less than $10. The 3/8-inch ones will weigh about 12 ounces or so. To make it a 4-ouncer, start cutting.

Sleeping bag pads are usually made 2' x 6', which is larger than necessary. All you really need is a pad that reaches from your shoulders to your hips, in order to cushion the pressure points, and insulate them from the heat-stealing ground. Cut the pad to this length, and cut it as narrow as you can as well. You might even want to cut it to a tapered shape, with the wider end for your shoulders.

Basically you want the pad as small as you can make it, but big enough to insulate your torso from the ground. Your head can be on a pillow made of spare clothes, and your legs can lay on your empty backpack to insulate them. If you need more padding, try two of these 4-ounce creations. At 8 ounces total, this set-up will still be more comfortable than one 12-ounce pad.

Pads For Fanatics

You can also cut pieces out of the pad. Putting many small holes of about 1/2" each in the pad doesn't seem to make it any less comfortable. Cut out a hundred little pieces of foam, and you might save another ounce. You also get bragging rights with other fanatical ultralight backpackers.

To be comfortable with a thin pad, or none at all, you can sleep where the ground is soft. Sometimes under a grove of pine trees a layer of needles has built up into a six-inch mattress. Areas with thick grass are nice too.

More Comfortable Sleeping Bag Pads

For more cushioning, an inflatable pad isn't out of the question for lightweight backpacking.For example, there is REI's **Big Agnes Air Core Pad**, a 3/4-length pad that weighs just 16 ounces and is an incredible 2 1/2" thick! If you have slept with Big Agnes, drop an email and let me know how comfortable she is.

There are several other self-inflating sleeping bag pads that are reasonably light. Thermarest and other pad makers are always improving their models. At least a couple self-inflating sleeping bag pads are under a pound.

Key Points

1. Down sleeping bags are the lightest for the warmth.

2. A synthetic-fill sleeping bag is a better choice if you will be getting it wet.

3. Get inside a few different sleeping bags to determine what you need.

4. A good lightweight three-season sleeping bag can weigh two pounds or less.

5. Sleeping pads are what make sleeping bags live up to their temperature ratings.

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Chapter Eight

Sleeping Bag Liners And Other Alternatives

Sleeping bag liners are designed to be used in your sleeping bag, in order to keep the bag cleaner (you just wash the liner), and to add some insulating value as well. I am not impressed with them. A typical liner weighs 8 ounces and only brings the temperature rating down by five to ten degrees. This isn't efficient! I'll wash the bag and go lighter.

I do have another use for a sleeping bag liner however - I have used them in place of a sleeping bag. The first time I tried this I was camping along the Manistee river in Michigan. It was a sleeping bag liner that weighed just five ounces (meant for a mummy bag).

My Five-Ounce Sleeping Bag

It kept me warm as the temperature dropped to the low forties. The key to my warmth was probably the fifteen minutes we spent gathering dead, dry bracken ferns to build a two-foot thick mattress, which we set the tent on. Then, with all my clothes on, I was fine - very comfortable, in fact.

Considering that I stayed warm with only a light sleeping bag liner in autumn, when it was a few degrees above freezing, this strategy should work for summer nights in the sixties. I bought the liner from Campmor, but I later sewed a simple myself, using bargain-bin nylon material ($1/yard) obtained at Walmart.

Using Sleeping Bag Liners By Themselves

Of course you should be careful backpacking with only a sleeping bag liner. Done incorrectly, it could be uncomfortable to the point of ruining your trip. Experiment near home first, and know yourself *and* your environment.

There are a few tricks to this. You can breath in your sleeping bag liner if it isn't too humid, and you'll be much warmer. Many "experts" will tell you not to do this, because you will be damp in the morning, but in a dry environment you will dry quickly once you hit the trail. You can dry out the liner during a break.

Another trick is the one mentioned above - using a mattress of dried plants. Use dead leaves, palm fronds, cattail leaves, some tree barks, or grass. A natural mattress of this sort keeps you insulated from the ground, which is what normally conducts away much of your heat. If you try this, scatter the leaves in the morning, so they won't smother the plants underneath.

Ultralight Backpacking Quick Tips

Fats produce heat when they digest, which is why eating whale-blubber keeps Eskimos warmer. If you want to stay warmer while you sleep, eat foods that are high in fat, like corn chips, as your last meal of the day. Arctic survival course used to teach you to eat a stick of butter by itself, but there are more palatable choices.

Tent poles broken? You can usually get by with sticks if your tent has straight poles. A trekking pole may work too. Otherwise, try tying the roof up to overhead branches.

Attach a couple alligator clips to the top of your pack, and you'll always have an easy way to hang clothing to dry while you hike.

Other Ways To Reduce Your Sleeping Bag Weight

There are some other tricks to try if you want to use a sleeping bag liner, or if you just want to get away with using a lighter sleeping bag. Essentially these are ways to stay warm. In other words, these are good little tricks to know no matter what you are sleeping in.

- Have a cup of hot tea just before going to sleep.

- Exercise a bit just before going to sleep - but not enough to sweat.

- Cover your sleeping bag liner or sleeping bag with extra clothes for more insulation.

- Sleep with your head slightly downhill. This takes some getting used to, but it really works.

- Go to sleep earlier or later - experiment to see which works best for you.

If you are warm when you get into your sleeping bag, you are much more likely to stay warm through the night. It is just plain difficult to get warm - especially in a thin bag - if you start out shivering.

I'm not recommending backpacking with only a sleeping bag liner, but it *can* work. I've gone out with just a bivy sack in my pocket, but I'm not recommending that either. I just think you should know all the possibilities.

Other Sleeping Bag Alternatives

They are hard to find, but there are "half-bags," which are designed to come up to your waist. I once made one of my own. The idea is that you wear your winter coat to insulate the top half of your body. A down half-bag is an extremely light option if you are bringing your down coat in any case. Experiment near home to see what temperatures you can handle comfortably this way.

If you are using a bivy sack as your shelter, you could skip using a sleeping bag altogether. Wear your clothes to bed, use a one-ounce hat, and try this only on backpacking trips when the nights will be warm. Use the same techniques as described above for sleeping bag liners.

If you try this with that four-ounce backpack and a four-ounce bivy, your "big three" base weight would be 8 ounces. That's super-ultralight backpacking!

Key Points

1. If done right, a lightweight sleeping bag liner can be used in place of a sleeping bag.

2. There are tricks to staying warm that can enable you to use lighter sleeping bag options.

3. Other options include a half-bag, or using a bivy sack like the sleeping bag liner example.

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Chapter Nine

Total Backpack Weight - How Light Is Light?

Is your total backpack weight twenty-five pounds. Then you aren't lightweight backpacking. I invent these standards, but I try to be reasonable. I backpack with less than fifteen pounds total pack weight. Most ultralight backpackers can carry less than twenty pounds for a three-day trip, and less than thirty for a week-long trip.

Throw out those backpack weight/body weight formulas. You know - the ones that say you can carry up to one fourth of your body weight or whatever. With ultralight backpacking, you'll never be close to what they say you can carry anyhow. It doesn't matter how much you *can* carry, only how much you *need* to carry to be comfortable.

Backpacking Isn't Masochism

The biggest reason to go lighten your total backpack weight is to enjoy the trip more. Obviously, then, you don't want to leave crucial things behind or otherwise make yourself miserable, just so you can call it ultralight backpacking.

Accordingly, my rule is this: Reduce that weight as much as you can without sacrificing those things that are most important to you (safety items, a good book, a bottle of rum?). Going light isn't about giving things up, but is about carefully considering what you really need to have a good time, and also replacing heavier things with lighter things.

Maybe you really need an inflatable pad. that's okay. Just get rid of that big two-pounder and buy a 13-ounce Thermarest Prolite 3. need a warm bag even in the summer? My Western Mountaineering sleeping bag weighs only 17 ounces and has kept me warmer than any 3 or 4 pound bag I've had. Never actually use those binoculars? Leave them home!

Ultralight Backpacking Quick Tips

Need to leave a note for rescuers or other people in your party? White birch bark (betula papyrifera) can be easily peeled from the trunk and written on with pen, pencil or berry juice. I have even sent birch bark envelopes through the mail.

If you have nothing else available, common household bleach can be used to purify water. Use about two drops per quart or liter of water - that's about 1/2 tablespoon for 5 gallons. Stir or shake and let it sit for thirty minutes or longer. Double the dosage for murky or questionable water.

If any of your damp clothes haven't dried by morning, wear them - unless it is too cold. They will dry quickly once you start hiking. This is generally safer than allowing damp clothes to accumulate in your pack.

How Much Total Backpack Weight?

Here is an example of what I bring on a weekend backpacking trip:

- Backpack: 13 ounces

- Down sleeping Bag: 17 ounces

- Nylon tarp: 16 ounces

- Rain suit: 14 ounces

- Plastic groundsheet: 2 ounces

- Sleeping bag pad (trimmed standard blue pad): 4 ounces

- Bathroom kit: 3 ounces

- First aid supplies: 3 ounces

- Knife, lighter, etc: 3 ounces

- Hat: 1 ounce

- Gloves: 1 ounce

- Homemade poly vest: 4 ounces

- Socks, 2 pair: 2 ounces

- T-shirt, long sleeve: 6 ounces

- Camera: 5 ounces

- LED light: 1 ounce

- Water (in plastic pop bottle): 16 ounces

- Raw sunflower seeds: 16 ounces

- Fudge-dipped granola bars (8): 16 ounces

- Tortilla chips: 16 ounces

TOTAL WEIGHT : 9 pounds, 15 ounces.

Okay, I really like to go light. You probably won't want to go this light. With proper equipment and strategies, however, you should be comfortable and safe with the following total backpack weight:

Summer, three days: 19 pounds.

Summer, one week: 25 pounds

Fall or spring, three days: 21 pounds

Fall or spring, one week: 27 pounds

Winter, three days: 25 pounds

Winter, one week: 31 pounds

Watch yourself to see what you actually use, and which items brought you the most comfort. Learn what you can, and you can leave some things behind next time, replace others with lighter items, and still have everything you need.

Key Points

1. You can safely and comfortably backpack with less than 20 pounds total backpack weight.

2. Going light is about enjoying it more, so don't leave behind crucial things.

3. By watching what you actually use and don't use, you can eliminate unnecessary weight.

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Chapter Ten

Knee Pain - Knee Braces And Other Solutions

If you ever have suffered from knee pain, you know it can ruin a hike. You need your knees working right if you are going to backpack. Knee braces can help, and there are a dozen other solutions here as well, although some of them are very temporary.

My own specific knee pain problem is pain on downhill stretches. I can walk all day if the ground is level or it is uphill. Put me five miles up some mountain, though, and when I come back down, my knees are screaming in pain. Actually, it is usually just one knee - the left one - and once I am walking on level ground, the pain is gone entirely.

I hope you don't have the same problem, or any other knee pain problems. If you do, here are some of the things that have helped me, at least temporarily, and some suggestions gleaned from doctors and other hikers who suffer from various knee problems.

1. Lay down with legs uphill or propped up on a rock. After experimenting with times, I have found that it is better to take more short breaks (about three minutes) rather than fewer long breaks. This is because three or fifteen minutes both seem to give only a few minutes relief once hiking is resumed.

2. Take numerous fifteen second breaks to put your leg up on a rock or tree and massage your knee. Sitting on the ground and holding your knee near your chest while massaging it works well too.

3. Longer strides sometimes help. This can only be done if the trail isn't too steep. The relief may come from the fact that the knee bends less.

4. Walk backwards. Warning: this is awkward and probably dangerous on uneven or steep terrain. Still, walking backwards gives me immediate relief. My knee problem must have to do with the way the foot is extended while bending the knee. The feet point upwards when walking backwards down an incline. I have had to walk backwards for five or ten minutes at a time just to make it down some stretches without pain.

5. Find ways to bend the knee less. This means walking funny, and you'll have to experiment to find out what works for you. This can be risky on steep loose sections of the trail. I only mention these temporary and potentially risky solutions because I have been in situations where it was walk back to the car or spend the night out unprepared.

6. Take aspirin. It not only will relieve some of the pain, but if taken before the downhill stretch starts, it may prevent some swelling that can cause knee pain. Try other pain relievers if they work better for you, but don't mask the pain too much, or you may do more damage to your knees than you realize.

7. Wear a knee brace. The neoprene ones that are sold in pharmacies may help support the knees

best. You can also try wrapping your knees with an ace bandage. In an emergency, you could also try wrapping your knees with a handkerchief, socks, or other clothing.

8. Respect your limits. If you have knee pain regularly, pay attention to how many miles of steep terrain you can take before suffering. Remember this limit when planning backpacking trips, and so you'll know when you reach the halfway point on out-and-back day hikes.

9. Stretching may help, especially if done before the knees start to hurt. Don't stretch too hard - gently stretch both calves and thighs.

10. Hiking poles or a good walking stick can help take the pressure off those knees on the downhill stretches. If you cut a dead branch or small tree to use for a walking stick, make sure it is long enough (up to your armpits). A longer stick works better on the downhill stretches, where you need it the most.

11. Poorly designed hiking boots or shoes can contribute to knee problems. Try different shoes or inserts. You need to avoid excessive pronation (foot flattening). Orthotic inserts such as Superfeet in your hiking boots or shoes may help, because they can help control excessive knee motion.

12. Simply avoiding steep routes when hiking can prevent knee pain. Look at all your possible routes before setting out. Even walking an extra mile or two may make sense if it means avoiding steep downhill stretches.

13. If the trail or dirt road you are walking on is sloped at the sides, walk on the side that is opposite from the knee with the most pain. This may help for those knee pains that are caused by pronation. The outward slant of the foot can mean less pain.

14. Soaking your knees in the cold water of a stream or lake may reduce the swelling and pain. If you are hiking during winter or high in the mountains in summer, you can try using snow as well. Wrap a handkerchief or shirt around the knee and pack it full of snow. (Careful! Frostbite or hypothermia are real risks in winter.)

Ultralight Backpacking Quick Tips

One way to lighten your load is to carry high-calorie foods. If you need to have about 12,000 calories for a weekend trip, this could be any where from fifteen pounds down to four pounds, depending on the foods you select. Mixed nuts, for example, have almost twice the calories per pound that bread has. You still have to have some variety and you have to balance the weight savings with decent nutritional choices, of course.

Need emergency containers? Birch bark (betula papyrifera) can be folded into many shapes and sizes. You can pin the folds with small sticks punched through the top edges of the containers. I have boiled water in such containers, and they could be used for collecting berries or other foods too.

Once, in Mexico, I had a mouse chew a hole through my pack to get at the food. This can be prevented by cleaning out any crumbs or food in your pack, and keeping it clean. Also, take your food out of it when you are camping.

Preventing Knee Pain With Exercise

When you exercise your knees, it is actually the muscles around the knee that are exercised. The bad news is that if you exercise the muscles unevenly, it can lead to more pain when hiking. The good news is that there are some simple exercises that can condition your muscles to reduce knee pain.

When the larger muscle on the inside of the leg above the kneecap (vastus medialus) is weaker than the outer thigh muscle (vastus lateralus), it can cause a slight misalignment of the kneecap. This can cause pain. A simple solution to this is straight knee leg lifts. This balances the strength in the two muscles. The outer thigh muscle also is the braking muscle (it slows the bending of the knee), so proper conditioning can prevent knee pain that comes from going downhill.

To do straight knee leg lifts, sit on the floor. Put one leg straight out in front, keeping the other bent at the knee with your foot flat on the floor. Lift the straight leg several inches off the floor and count to five, keeping the knee straight. Lower it, rest a moment, then repeat the process four more times. Then switch to the other leg. Do this every day for a while, gradually increasing the number of repetitions and the length of time you hold each leg up.

Walking uphill can be a good knee exercise too. If you can't easily do this on a regular basis, try doing step-ups. This is just stepping up on a stair-step or anything of about that height, and then stepping back down. You should alternate which foot you lead with.

Start by doing this for several minutes several times per week. Increase the step height and the duration, and wear hiking boots if that is what you hike in. You can also start to wear a backpack while doing your repetitions (put some weight in it, of course).

Key Points

1. There are different types of knee problems.

2. There are things you can do on the trail to treat knee pain.

3. Knee braces and shoe inserts can help.

4. Proper exercise and conditioning can prevent knee pain.

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Chapter Eleven

Foot Care

My number one foot care recommendation is to get out of your thick socks and heavy hiking boots. I stopped getting blisters when I started wearing thin socks and running shoes for backpacking. I'll have more to say on that in the chapter on hiking boots and shoes. Whether or not you can or want to switch to shoes instead of boots, you need to take care of your feet. here are some ways to do that.

Foot Care For Sore Feet

Replace your shoes. The padding breaks down in your shoes long before you can see the difference. This is a common cause of sore feet. If you are hiking in rugged terrain, you should probably replace your shoes every six months or 500 miles.

Make sure your shoes or hiking boots fit correctly. If you are not sure how to fit your shoes, go to a footwear store where serious runners go. Also make sure you have some arch support if you have any knee problems.

See if insert help your sore feet. Gel insoles, air insoles and regular cushion insoles have all helped people with sore feet. Most of them are relatively inexpensive, so experiment.

See a doctor. If your sore feet are a real problem, see a specialist. You may have a treatable condition. For example, if you feel pain in the sole or heel of your foot when you first stand up in the morning, you may have plantar fasciitis.

Foot Care - Blister Prevention And Treatment

Don't wait until you have blisters to stop hiking. Stop as soon as you feel a "hot spot," and do something about it. "Moleskin" should be applied to prevent the spot from becoming a blister.Some people use duct tape if they have nothing better. A small bandage can work too.

Tighten up your laces. A loose shoe lets your foot slide around inside, and this can lead to blisters. Try to tighten the laces evenly - not just at the top.

If you have a blister, apply a small piece of moleskin, with a hole cut out for the blister to rest in. This keeps the pressure off the blister, so it won't get worse. If you can, leave the blister unpopped. If you have to pop it, sterilize a pin or needle with alcohol or a flame, and insert it into the blister from the skin along one side. Gently push out the fluid, then cover the blister.

Friction causes blisters, because friction causes heat. Keeping your feet cool and dry is therefore a good way to prevent blisters. See the section on general foot care below.

Ultralight Backpacking Quick Tips

Sleeping with your head slightly downhill will keep you a little bit warmer according to some backpackers. I have tried it, and it does seem to work. It can take some getting used to, however.

Out of toilet paper? Use the soft fuzzy leaves of the mullein plant (verbascum thapsus), also known as "lumberjacks toilet paper. Test carefully at first, as any plant can be irritating to some individuals.

You can stop nylon straps and cords from fraying further by melting ends and loose threads with a match. Be careful - molten nylon can burn fingers to the bone.

Athlete's Foot

You can use the commercial treatments to get rid of athlete's foot. I have had better luck using tea

tree oil. You can find this in any place that carries natural foods and medicines. Just rub a few drops on your feet each morning, and then put your socks on.

To prevent athlete's foot, don't go barefoot in public showers, or thoroughly wash your feet after doing so. It also helps to keep your feet dry and cool as much as possible. Sunlight may kill the fungal spores, so holding your bare feet up in the sun for a few minutes each day may help (it's also a good excuse for a trail side break).

General Foot Care

Try to develop good foot care habits. This means stopping and treating your feet when you feel pain. It also means stopping to air out your feet. Use the following routine a couple times during a day of hiking, and you will have healthier happier feet:

- During a break, remove your shoes or hiking boots for at least several minutes.

- Remove your socks and set them on a rock or branch to dry out and air out.

- Remove any insoles from the shoes or hiking boots and set them out to dry.

- Check your feet for hot-spots, and clean off any fuzz or other objects.

- Let your feet cool off in the breeze, and expose them to sunshine if possible.

- When you put your socks on, avoid having wrinkles or seams against the bottom of your foot.

- Shake out your shoes before putting them back on, and then lace them up tightly.

Every time I hike to the top of one these mountains here in Colorado, I spend some time there barefoot. I am convinced that this five-minute routine is part of the reason I don't have any foot problems now.

Key Points

1. Worn shoes can cause foot problems.

2. Insoles can help with sore feet.

3. Blisters and other foot problems can be prevented.

4. A routine for foot care while backpacking or hiking will prevent most problems.

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Chapter Twelve

Physical Conditioning

Why physical conditioning? Because you will not only be safer and more prepared for your backpacking trips, but you will enjoy them more if you are in good shape. It is nice to still have some energy at the end of the day.

What is the best way to approach physical conditioning for backpacking? By backpacking. If you want to get in shape for any particular activity, the best way is usually just to do that activity. In other words, put on that backpack and get out there.

If that isn't always practical, try to exercise in ways that closely resemble the backpacking you'll be doing. If you will be in the mountains, for example, do a lot of hiking up and down stairs to prepare. Start walking to the store more often, or walking to work.

If your physical conditioning involves hiking near home, try to find trails instead of streets to hike on. The uneven ground will work better for strengthening your ankles. Put a little weight on your back too. A couple gallons of water in your backpack is probably enough.

If you will be backpacking in the winter, turn down the thermostat for a few nights before you leave. You might even want to use a public pool to prepare for cold weather camping. Regular swimming in cool water causes the layer of insulating fat just under your skin to thicken up.

Ultralight Backpacking Quick Tips

Use a lightweight hat and gloves for high mountain hikes. Hiking uphill in near-freezing weather will often get you hot enough to remove even your shirt. While your trunk is hot, though, it is still common to have ears and fingers aching from the cold. A light hat and gloves will prevent this and add only a couple ounces to your pack weight.

If your calves are overworked, you can let your thighs do more of the work during uphill stretches. Just stop pushing off as much with your toes. Of course, walking in new ways for too long can cause new problems, so use this as a temporary relief.

Unless wind is a problem, pitching your tent to face the rising sun will not only wake you up, but help dry out the tent in the morning. This means pitching it to face east-northeast in the summer, east-southeast in the winter, and east in the spring and fall.

Some Physical Conditioning Tips

- Eat a mix of proteins and carbohydrates within forty-five minutes after finishing any heavy exercise. The latest research shows that this greatly helps muscle recovery (the repair and rebuilding of muscle that is broken down during exercise). Remember this when you are hiking hard too. Eat!

- Back problems? Leg lifts and sit-ups can strengthen and condition the lower back muscles.

- Straight knee leg lifts and simple step-ups can condition the muscles that control your knees. This can prevent knee pain and problems.

- You can lose much of what you gain from exercise if you stop for even a week. Try to get twenty or

thirty minutes of good aerobic exercise at least every few days.

- If your hectic life makes it hard to have a regular physical conditioning routine, use little tricks. Parking the car farther from the store, doing the household vacuuming, and using the stairs instead of the elevator are all much better than nothing.

I was once backpacking with a weight-lifter who worked out at the gym every morning. I was carrying more weight on my back, but he was the one getting tired going up those hills. Obviously, not every form of exercise is helpful in preparing one for backpacking. Look for physical conditioning routines that work the same muscles you'll use and/or most closely resemble the actual bodily actions involved.

Key Points

1. Being physically prepared makes backpacking safer and more enjoyable.

2. If you can't exercise regularly, at least use little "tricks" to stay in shape.

3.Your physical conditioning routine should prepare you specifically for backpacking.

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Chapter Thirteen

Hiking Shoes

Should you wear hiking shoes, running shoes, walking shoes, or hiking boots? I can't tell you what is right for you, but I can tell you that anything with "boot" in the name sounds too heavy for my tastes. I can also give you probabilities: you will probably be better off with running or hiking shoes than with heavy hiking boots.

Hiking shoes or running shoes are better for most people, at least during late spring, summer and early fall. Hiking boots are hot, and once they are wet, they tend to stay wet forever. However, weight may be the biggest reason more and more backpackers are using shoes.

According to research done by the U.S. Army many years ago, a pound on your feet is equivalent to five on your back. Some say it is equivalent to six. This equivalency is in regard to energy expenditure, and though I don't know exactly how the research was done, I suspect the conclusion is close to the truth. It is easy to hike ten miles with twenty pounds on your back, but try it with nothing on your back, but a ten-pound weight on each foot - you'll get the point.

Five pounds per pound or six - whatever the truth, you can understand why three-pound boots leave you tired at the end of the day. Why then, do so many people wear heavy hiking boots instead of lighter hiking shoes?

Ankle Support

You have probably heard that you need the ankle support provided by hiking boots. Is this true? If so, how did people all over the world, throughout history, manage without stiff ankle-supporting boots? They had stronger ankles!

Perhaps the problem is weak ankles, not a lack of support. Want stronger ankles? Try walking a little each week on uneven ground (not in the mall). That should solve this problem. Unless carrying thirty-five or more pounds when backpacking, most people just don't need extra ankle support after a few weeks of simple exercise.

Of course some hikers need boots, especially if they have specific problems with their ankles. Still, I have yet to meet a person who has tried backpacking in hiking shoes or running shoes and then returned to boots. Lightweight hiking shoes are so much nicer! Don't settle for hiking boots until you are sure your ankle problems are not due to a lack of exercise.

The Advantages Of Running Or Hiking Shoes

It isn't all about the weight. In a good pair of running shoes your feet will stay cooler than in hiking boots. This isn't a small matter. Cooler means fewer blisters. Blistered feet can be a serious problem - your feet are all you have to carry you out of that wilderness.

Once I started using running shoes and lightweight socks, I stopped getting blisters. I don't mean I've had fewer blisters. I mean haven't had any blisters on my feet at all in over ten years. I didn't have one blister after a 110-mile 7-day trek in the Rockies, for example.

One supposed advantage of hiking boots is that they keep your feet drier. Do they? You sweat inside those boots, and even the best waterproof breathable hiking boots will leave your feet damp from this alone. Add to that that they are rarely entirely waterproof, and I just don't see any advantage here. Hiking shoes, on the other hand, breath well, and when they get well, they dry quickly.

Choosing Your Hiking Shoes

Since weights are not always shown in catalogs, so sometimes have to just guess at which hiking shoes are lighter based on the description and photo. This gets easier with experience. If the weights *are* shown, find a pair that weighs two pounds or less per pair - unless you have size 13 feet.

If the attention doesn't bother you, you can also take a small kitchen scale into the shoe store with you. Again, try to keep it to 16 ounces or less per shoe. After looking at different shoes for a while, you'll be able to guess the weight within a couple ounces.

Good quality running or hiking shoes (either work fine as far as I can tell) will always have their soles stitched to the uppers. Check this by removing the insoles to look - a removable insole is another sign of quality shoes. The "footprint," or bottom of the sole shouldn't be too large. Large soles can cause twisted ankles by coming down on rocks or roots too far out to the side of your foot.

Walk in the shoes to see if their are any areas that rub your foot or feel uncomfortable. Some shoes will bend near the bottom of the tongue, and push (eventually painfully) into the top of your foot. Good shoes should hold your heel firmly.

Ultralight Backpacking Quick Tips

Cramps in your legs can be caused by depletion of minerals such as potassium, calcium, sodium, and magnesium. This depletion of minerals may be worse if you are using prescription diuretics - or even just drinking too much coffee. Try sports drinks (you can bring these backpacking in powdered form) if you regularly have this problem.

Small shoes are painful after a long day's hike. Try boots or shoes on in the afternoon, when your feet are usually swollen a bit. When in doubt, buy hiking boots or shoes a half-size larger than you normally wear.

Zippers that are sticking or difficult can be lubricated with soap. Rub the soap along the length of the zipper, or use your fingers to work it in.

How Much Are Decent Hiking Shoes?

Buy the latest high-tech hiking shoes, and you'll pay a high-tech price. However, there are discount catalogs that have closeouts on great running shoes. I regularly find $90 running shoes on sale for $40 or less. I have no problem wearing last years style for a savings of $50.

You can also find closeout sales at shoe stores in any shopping mall. Even if it isn't a closeout, I can usually find a good pair of running shoes that weighs less than 28 ounces for under $60.

I once bought a pair of shoes for $7 (weight 28 ounces - size 11), and used them for a seven-day backpacking trip in the mountains. They worked okay, but they barely survived the trip. Durability seems to be the primary problem with cheap shoes. You are better off waiting for a sale on good quality hiking shoes.

Other Options

I have seen more people hiking in sandals lately. Some are even designed for hiking now. I like the idea of my feet being cooler, but it seems like there would be too many problems on steeper terrain - like your feet sliding around and stones getting under the sole of your feet.

I recently read a story of a man who hiked the almost 300 miles in Vermont barefoot! I did travel a couple miles down a beach that way once while backpacking, but apart from special circumstances like that, I sure can't recommend this.

I have also occasionally seen people hiking in moccasins, and even in flip-flops. I wanted to mention all the alternatives, but I think I'll stick to running or hiking shoes. I recommend you do the same (but let me know if you find some better way).

Hiking Socks

Hiking socks used to all be thick and warm and sure to cause blisters. They are getting better now, but none of the high-tech socks can yet compete with my thin nylon dress socks from WalMart. Yes you read that right - I wear nylon dress socks that cost $4 for 3 pair and weigh less than an ounce per pair. I stopped getting blisters when I started using these and running shoes.

Blisters are caused by the heat from friction, so thicker socks - no matter how soft - often contribute to the problem. Why not give thin socks a try? Just be sure they are "box cut," so there is no seam under your foot or across your toes.

Lightweight nylon socks are light - a big advantage for an ultralight backpacker. They also dry fast. This means you can rinse them out and have a fresh, dry pair in an hour.

Let me repeat this one more time: I have NEVER had a blister when using light nylon dress socks with running shoes, not even after a 39-mile hike in North Carolina one day - in $7 shoes.

I have a heavier pair of socks for sleeping in when it is cold (wool, 3 ounces). I also have heavier socks for winter hiking. The wool-blend hiking socks seem to work best for this. Having enough dry socks may be more important than having thick socks.

One last word on hiking socks - they are never cotton! Don't hike in tube socks. Cotton socks stay wet forever. They are hot in the summer and cold in the winter. They cause blisters. They are also just too heavy for ultralight backpackers.

Key Points

1. Running or hiking shoes are better than hiking boots for most backpackers.

2. Ankle support isn't as important as having stronger ankles.

3. Good hiking shoes should weigh less than two-pounds per pair.

4. You can find decent shoes for under $60 if you try.

5. Lightweight nylon dress socks may be better than expensive high-tech hiking socks.

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Chapter Fourteen

Outdoor Clothing For Backpackers

What kind of outdoor clothing is best for backpacking? This is one of my weak areas. You see, I love most of the newest specialty clothing with their new materials, wind resistance, "wickability," and more. The problem is that I don't like to spend that much, and the gains in performance and weight savings get small here in relation to the higher prices.

Did you get that? For example, a sleeping bag matters to me. I save a couple pounds for $100 more - and get a better, warmer bag. With many pieces of outdoor clothing, on the other hand, you pay a lot more to get a slightly better item that saves you an ounce or so. Spend the money if you want to - most of what these manufacturers say about their clothing is true - but their are cheaper alternatives that will work *almost* as well.

Outdoor Clothing - Other Options

Since my specialty in this area is being cheap and efficient, that is what I will concentrate on. As I said in the introduction, the point of a new book isn't to say everything about a subject, but to say something new. With that in mind, some outdoor clothing ideas and options you may not have heard of follow.

Consider what you really need for your plans. Scaling peaks in Patagonia for a month? You may have to stick with the best sales you can find on the high-quality stuff. On the other hand, for a fair-weather overnighter, a two-ounce, two-dollar plastic poncho isn't out of the question.

Pants

This is one of those areas where I'll spend a little for good outdoor clothing. Jeans don't belong on most wilderness trips. Soft, lightweight and quiet brushed-nylon pants (7 ounces versus 24 ounces for jeans) will not only save weight, but they dry fast. For this reason, they'll usually keep you warmer than heavy jeans (getting cold is usually from being wet). Of course, I do wait until they go on sale.

I have a pair of hiking pants that have zip-off legs (9 ounces). I don't care for the idea. The zipper areas become dark bands of dirt, and the zippers jamb. I found it is better to wear plain lightweight pants (7 ounces) and carry single layer nylon shorts (2 ounces). Same weight over-all, with fewer problems.

Shirts

I like the cheap poly-cotton blend t-shirts. They weigh 5 to 6 ounces, and dry quickly, unlike the pure cotton ones. I also like silk button shirts. They weigh just three ounces, and used to show up on the racks of thrift stores regularly for $3. They are comfortable too, although some styles make me look like I'm searching for a wilderness disco.

Sweaters

I like wool. The newer poly-pile fabrics have surpassed it in performance for the weight (by a little), but light wool sweaters (10 to 14 ounces) work almost as well. They also don't stink after a day's wear. Oh, and I buy them at thrift stores for a couple dollars.

Underwear

I like lightweight boxers - they double as shorts. For insulating underwear, I buy whatever promises the most warmth for the least weight - but I buy it on sale.

Gloves

Lightweight poly-pile gloves work well, and can be worn under a shell-mitt for more warmth.

Hats

I have a sun-hat I bought on sale and weighs just four ounces. It is great for here in Colorado and I used it when I lived in Arizona too. It has save me from a sun-burned neck more than once. I have a

good lightweight balaclava for colder hiking (2 ounces), but I often take my lighter homemade one.

Coats

I try to use my rain jacket as my only jacket lately, to save weight. Down coats (which also can be found at thrift stores) are my preference for colder weather, but be careful if you will be getting wet. Down is pretty worthless when wet.

Ultralight Backpacking Quick Tips

You can make a cheap closed-cell foam sleeping bag pad fold up like one of the more expensive ones. Cut it across, halfway through, every foot or so, alternating sides. It should fold up nicely, accordion-style. I have used mine repeatedly this way without them breaking. Folded up, the pad can also be used to stiffen the back of a frameless pack.

If you run into cold weather unprepared, you can use the seed head fluff from cattail plants to insulate your jacket. Watch for the stalks with their fluffy heads in wet areas. Put a layer of this fluff between your sweater and your jacket, and you'll effectively turn it into a winter coat.

To keep certain items from sliding down to the bottom of your pack (like a camera, for example), put them in a small nylon pouch and safety pin the pouch to the top inside seam of the pack. Don't let the pin puncture the pack - only do this if there is enough extra material to pin to along the top seam.

Make Hiking Clothes

Sew your own hiking and backpacking clothes? Forget it. Too much work. However, I have made a few simple things.

- To make a light ski mask, use an old polypropylene thermal underwear top or bottom. Cut 12 or 14 inches off a sleeve or leg, and pull the piece over your head. Mark where your eyes and mouth are with a pen or marker, then cut holes. You now have a balaclava. Mine weighs less than an ounce. You can sew the top shut if you want, or just pin it shut with a safety pin.

- Put your hand in a sock, spreading the fingers slightly. Mark the sock at the fingertips with a pen. Cut holes here for your fingers. This is a way to make cheap hand warmers. Wear them under other gloves or mittens for more warmth.

- Want a cheap and light insulating layer? I wore a four-ounce piece of poly batting like a tunic under my outer shell, to the top of Chimborazo (20,600 feet) and other mountains. Buy a roll of the batting used for making blankets and pillows, cut out a 4-foot by 2-foot piece, put a hole in it for your head, and you are done (it will make sense when you try it). I made mine as a disposable top, but I used it for years before it fell apart.

How Much Should Outdoor Clothing Weigh?

You should be able to find several good lightweight options (for any size), that fall within the weight ranges listed below.

Shoes: 20-40 ounces/pair

Socks: 1-3 ounces/pair

Underwear: 1-3 ounces

Pants: 8-18 ounces

T-shirts: 4-6 ounces

Shirts: 3-9 ounces

Sweaters: 8-13 ounces

Windbreakers: 7-14 ounces

Hats: 1-4 ounces

Gloves: 1-4 ounces/pair

Down Vests: 6-16 ounces

Down Coats: 16-40 ounces

Rain Pants: 6-10 ounces

Rain Jackets: 6-12 ounces

Read what the manufacturers say about their outdoor clothing. Many will give you all sorts of descriptive information (weight, temperature ratings, materials, special features) Mostly they will tell the truth. What they won't do - what they can't do - is tell you how to balance the various factors, like weight, cost, performance, and your personal comfort. This more complicated accounting you have to do for yourself.

Key Points

1. Clothing for backpackers should be light.

2. Clothing for backpackers should be quick to dry.

3. Outdoor clothing doesn't have to be expensive.

4. There are many options, including making some clothing on your own.

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Chapter Fifteen

Rainwear

How light should rainwear be for lightweight backpacking? Here is a rough guide: rain jacket under 13 ounces, rain pants under 10 ounces, and poncho under 16 ounces. You shouldn't have any problem finding high-quality rainwear at these weights or less. Now, what kind of rainwear should you buy?

Rain Suit Options

I like my My Frogg Toggs. These rain suits were originally made for golfers, and you can still buy them at many golf pro shops. They will cost you about $50 per set.

Mine weigh just 7 ounces for the top, and 7 ounces for the pants. They are baggy and papery, but the waterproof/breathable fabric has held up through heavy rain, snow, and 50 mph wind at 20,600 feet. After years of use, they have only two duct-tape patches. However, I wouldn't try to use them in for bushwhacking through heavy brush. They are fragile.

I may go with tougher nylon rainwear when I buy again. What has changed my mind, or may change it, is that some new lightweight rainwear can finally compete on weight. I have no real complaints with my Frogg Toggs, but *if* I have the money, and *if* they are just as light, and *if* they breath as well, I'd rather have a tougher material. Of course, that's a lot of ifs, so maybe I'll stick with my Frogg Toggs.

Lightweight Rainwear - Other Options

Some backpackers carry just a rain jacket, and no rain pants. This works if the climate isn't too cold, because lightweight hiking pants will dry quickly after they get wet. Just don't try doing this with jeans - they take forever to dry (a good reason to never use them for hiking).

Ray Jardine, the "father" of ultralight backpacking, swears by umbrellas. I have used them backpacking, but found them to be more trouble than they are worth. They do have some advantages. They can be used as a sunshade, and they *are* nice for a little "roof," if you are sleeping in a bivy sack.

When it's warm, with little chance of rain, you can bring a 2-ounce plastic emergency poncho. They cost a dollar or so. They are sloppy, and blow around in the wind, but they are better than nothing.

I have found that a large garbage bag is a better option. They are tougher than those emergency ponchos, and still only weigh about 2 ounces. Cut the bottom corners to make small arm-holes, and cut a hole between those for your head.

Another lightweight rainwear alternative is a good nylon poncho. Try to find one that is meant to also work as a tarp-shelter. Many of these weigh less than 16 ounces now. Bringing dual-purpose items is a good way to keep the overall pack weight down. Even if you still use a tent, the poncho can provide a "covered porch" out front.

You could bring nothing. This may be a risky strategy if you don't know what you are doing. Hypothermia from getting wet is a real concern any time of the year. On the other hand, if you know

that it almost never rains in a given locale at a given time (like the southern Sierra Nevadas in September, for example) you could try it. See the bit on "staying dry" below.

Ultralight Backpacking Quick Tips

Small resealable plastic bags are great for carrying things like sun block, hand cream, toothpaste and even spices for cooking. The smallest ones can be found in the craft section of department stores. I usually put several of these (full of various things) inside a resealable sandwich bag for extra safety.

Milkweed down is the seed fluff of the milkweed plant. It is similar to goose down in appearance and insulating value. The seeds are easily stripped off, and when fluffed up you can fill a couple bread bags with the "down" for instant warm mittens. Just insert your hands and tuck the ends of the bags into your sleeves or rubber band them to your wrists.

Never store a tent wet. Tent makers will tell you that mildew eats away at the waterproof polyurethane coating. Set the tent up at home to dry before putting it away.

Using Rainwear

If you wear a rain suit that is waterproof, but is *not* breathable, be sure to take it off as soon as the rain stops. The inside of it will likely be wet from condensation, and will get your clothes wet eventually. You may have to turn it inside-out to dry it before you put it away.

Even if your rain suit is waterproof and breathable, it won't breath perfectly. To avoid getting damp inside it, take it off when it isn't raining. If you are using it as your only outer shell, you can leave it on when it isn't raining, but be sure to remove it as soon as you get too warm.

Watch for leaks in your rainwear, especially at the shoulder-seams. You can reseal these with seam sealer from any place that sells outdoor gear. Duct tape can also be used for small holes.

Staying Dry

There is more to staying dry than just bringing rainwear. The following tips will help whether you have a great rain suit, a garbage-bag poncho, or no rain gear at all.

- Learn a little about the weather. Thunderstorms come almost every afternoon in many parts of the Rocky Mountains, for example. You can avoid the worst of the windy thunderstorms by getting down to tree-line before noon.

- Take advantage of the rain to eat a snack under a thick tree or stand of trees. Even if you have rainwear, this will keep your shoes or boots from getting soaked.

- If you are using a garbage bag poncho, and it is warm enough, put your shirt in your pack to keep it dry during the rain, or roll up your sleeves to your shoulders. It is easier to dry off your arms than shirt sleeves.

- Watch the weather. When you see rain coming, start looking for rock overhangs, trees or other shelters that can keep you dry.

- If your clothing gets wet, try hiking for a while after the rain stops. This will dry the clothes faster, so you won't be stuck with wet clothes when the cold night comes.

- If you change into dry clothes, don't forget to take any opportunity to dry the wet ones. Hand them from your pack as you hike if the rain has stopped, or hang them from tree branches when you take a break.

- Fires have ruined many a piece of clothing that they were meant to dry out. Many modern materials melt easily when struck with sparks. Try to keep clothing a good distance away from the flames and sparks.

- Avoid the temptation to slog through streams without rolling up your pants, or swim with clothes on. It may be sunny and warm now, but if those clothes don't dry before dark, you could be in for a miserable night.

Key Points

1. Backpackers have many options for rainwear.

2. It helps to know how to properly use rainwear.

3. It also helps to know the tricks to staying dry.

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Chapter Sixteen

Trekking Poles - Do You Really Need Them?

There are new, lighter trekking poles being made every year. My knees seem to get weaker every year. These two trends are coming together to change my mind.

You see, I never used to use trekking poles, or walking sticks on backpacking trips. I didn't need to. I also bought the argument that more weight meant more total energy expenditure - a potentially serious issue for a long-distance hiker.

Then I was laying on my back one day, 20 miles into the day with 6 miles more to go to get home, unable to walk due to the pain in my knees. After laying with my feet uphill for a while, I was good for another few minutes of hiking. I eventually limped home. The next time I took a long hike, I brought along a walking stick. It really seemed to help on the downhill stretches.

Do You Need Trekking Poles?

What if you don't have any knee problems, and you're hiking on level ground? Then there may be no reason to use trekking poles. Of course bad knees are not the only reasons to use trekking poles. Let's look at some of the supposed advantages and disadvantages.

Carrying them in addition to everything else means you expend more energy. This is the reasoning used by many to reject their use. This is true, but the flaw in this thinking is that it assumes total energy expenditure is the only important factor.

It may be the most important factor for some marathon hikers. However, for many backpackers, the limiting factor isn't total energy, but the wearing out of their legs or knees. Trekking poles do take weight and stress off your legs and knees, especially on downhill stretches. They may even make an extra couple miles possible.

Trekking poles also help you keep your balance. You can defend yourself against wild animals with them. I use my walking stick to rest my head on from time to time. I also use my walking stick as a mono-pod to steady the camera for certain shots. If I didn't have any knee problems, however, I wouldn't use a walking stick or trekking poles.

Ultralight Backpacking Quick Tips

If you have to cross streams with your shoes on, at least remove your socks. This way you'll soak up a lot less water. You can put the socks back on when you have hiked a few minutes on the other side of the stream, and your feet will dry much faster than if you had worn the socks in the water too.

Need an emergency disinfectant? A strong tea of boiled juniper (genus juniperus) needles and twigs can be used to sterilize things.

Mashed potato flakes are not only convenient by themselves, but can be used to thicken a soup if you have added too much water.

Trekking Pole Options

I recently saw a pair of trekking poles that weigh just 2.7 ounces each. They are made of a high-strength carbon fiber, and are supposedly as strong as any normal poles. That's about half the weight of the nearest competition, and I would own a pair now if it weren't for the price.

I am not going to try to keep this book up to date with specific recommendations. Just be aware that there are many good trekking poles out there that weigh less than 9 ounces each. You tend to get what you pay for, so be careful with the "cheapies" unless they good ones that just happen to be on sale.

My solution is to make a walking stick along the trail. I cut a dead stick, which I use until I lose it. I commonly forget my walking stick somewhere - a good reason not to buy expensive trekking poles. Sometimes, at the end of the trail, I leave it for the next backpacker. They may not be as light as high-tech poles, but you can leave them behind when you no longer need them.

Want a cheap alternative that doesn't involve cutting and whittling your own walking stick? Try ski poles. You may want to remove the baskets, especially if your hiking in wooded areas where they may catch on something.

Bamboo also makes good light hiking staffs. It's stronger than it looks - try a piece that is only about 3/4" thick. I bought mine as decorative bamboo (four dollars for three six-foot pieces), and cut it to size. I glued on soft leather for a comfortable handgrip, and wrapped the bottom so it wouldn't split.

I prefer one walking stick or pole to a set of trekking poles or walking sticks. I like to have a hand free. However, most people seem to prefer the balance of using two at once. You just have to try it both ways to see which works better for you.

Some of the new tents and tarp shelters for backpacking are designed to use your trekking poles as supports. Getting one of these shelters may help you justify the extra weight of the poles.

Key Points

1. Trekking poles cause you to use more energy, but save your knees.

2. You may not need them.

3. There are other alternatives to trekking poles, like walking sticks and bamboo staffs.

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Chapter Seventeen

Camping Stoves

Camping stoves are a pain in the... well, that's my own opinion. Some use fuels that are difficult to find, while others need to have their jets cleaned regularly. They all are affected to some extent by altitude and cold weather. They require you to carry canisters of fuel that can cook five meals, even if you only plan to cook once. Some of these fuels can be expensive as well.

What is a backpacker to do? Well, I don't have a rundown of all the different camping stoves here. Most of them are really too heavy for lightweight backpacking. I am going to make one general suggestion, then, for a cheap and light stove. Then I'll discuss an even simpler option.

Alcohol Backpacking Stove

An alcohol stove is one of the lightest options available. They are light, the fuel is available everywhere, and it is cheap. It's safe to carry alcohol because it isn't explosive. You can carry the exact amount of fuel you need, and you can carry it in almost any container.

This explains why the pepsi-can-stove became popular with ultralight backpackers. If you have seen it described on the net, you know the do-it-yourself diagrams are sometimes hard to understand. For simplicity, my own Pepsi can stove is just the cut-off bottom of a pop can that I burn alcohol in, and cook over.

My version isn't the most convenient, and it works poorly, but it weighs less than an ounce. I use a few rocks to put the pot on, with the stove in the middle. Sometimes I may rig a quick tripod of sticks to hang the pot from, or use whatever works at the moment.

Don't try this at home. Buy a commercially made one. Brasslite.com and others have some that are

under 2 ounces, and they are designed to preheat and vaporize the alcohol for much better performance than I get from mine.

Note: Alcohol doesn't burn very hot, so it isn't recommended if you will be backpacking in the winter. A white gas camping stove would be a better choice for that.

What kind of alcohol do you use? Any of the following:

- Denatured alcohol. You can find it in hardware stores in the paint thinner section.

- Gas treatment. This is the stuff meant to remove the water from your car's gas lines and tank. Just look at the ingredients to be sure it is alcohol. You can find it in any place that sells car-related products.

- Rubbing alcohol. This works, but not as well (it is usually only 70% alcohol). The advantage of it is that you can buy it in virtually any pharmacy, grocery store or dollar-store. Avoid the ones with colors or scents added.

- Stove fuel. Some camping stores are now selling alcohol for stoves.

You can carry alcohol in a plastic container. I use an eight-ounce mini soda bottle. An ounce for a stove and an ounce for the fuel container - that's keeping it light.

How much fuel should you bring? Do the math. Practice with your stove to see how much fuel it takes you to cook a pot of soup. Then multiply that by the number of meals you plan to cook on your trip. Add an extra ounce or two, just in case.

Ultralight Backpacking Quick Tips

Use film canisters for carrying things when backpacking. I usually label them with a piece of masking tape on the side. Put them in a plastic bag for extra security - the tops will sometimes pop off. Of course, these may be hard to find soon, with everyone using digital cameras.

Toothache? Pieces of oak bark (genus quercus) can be chewed for relief. Don't take it from the trunk, but scrape softer pieces off branches. Use in moderation, as the tannic acid can be hard on the stomach.

To test a tent site, lay out your groundcloth and lay down on it to see if it is a comfortable place. Remove rocks and sticks. You can even scrape a small depression where your hip will be, for greater comfort (fill the hole in the morning).

Do You Need A Camping Stove?

In 27 years of backpacking, I have actually never owned a camping stove, except for my homemade pepsi-can can stove. I honestly rarely even bring that. I can eat granola bars and nuts and tortilla chips for days on end without problems. I forage for fresh food along the trail as well.

I have a small aluminum pan. It holds a quart and weighs just two ounces. I use it to heat water in

over a twig-fire, so I can have hot tea made of whatever wild herbs are available. Still, even this pan is a rare addition to my packing list. I just don't need hot meals or drinks to be happy, even on week-long trips. There are so many healthy and delicious ready-to-eat food options now.

The advantages of camping without a stove are clear. There is less weight to carry. You eliminate not only the weight of the stove itself, but also the weight of the fuel and the cooking pot and spoon. Life on the trail is much simpler as well - no time spent cooking or cleaning pots.

Obviously a backpacking stove is not a necessity, except when needed to melt snow or ice for drinking water. However, we are all different. I *do* backpack for enjoyment, and if that meant I needed a hot meal for dinner, I would bring a stove. In other words, you have to figure this one out for yourself.

Key Points

1. Alcohol stoves are the lightest and cheapest stoves for backpacking.

2. There are several types of alcohol you can use in them.

3. You don't necessarily need to bring a camping stove.

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Chapter Eighteen

Outdoor First Aid Kit

Your first aid kit should be suited to the environment you will be backpacking in. It should also take into account your own personal needs (bring sinus medicine if you commonly have sinus problems). Below is an example of a simple first aid kit.

Basic Outdoor First Aid Kit

Gauze Pads
Soap Towelettes
Adhesive Bandages
Butterfly Bandages
Knuckle Bandage
Dental Floss (30 feet)
Hydrocortisone
Triple Antibiotic Ointment
Burn Ointment
Pain Reliever
Safety Pins
Medical Tape
Tweezers
Moleskin

Ultralight Backpacking Quick Tips

Planning to hike in very popular areas? Be prepared for crowds. Leave early, or better yet, plan your trip for weekdays. Looking at the register on top of Mount Shavano recently, I saw that there were only one or two people summiting per day during the week, while Saturdays and Sundays often had as many as thirty hikers signing in.

If you need a quick antiseptic dressing for small cuts, look for a balsam fir tree. The younger trees have "blisters" on their trunks. Pop one of these blisters and you can use the sap inside to cover the cut. It will even smell good, and can be easily re-applied if you are hiking in an area with these trees.

For a small wash basin for doing dishes in camp, use the bottom of a plastic milk jug. Cut it off at about three inches deep and it will weigh about an ounce or two.

There are, of course many other items that could be added to you outdoor first aid kit. Some people carry snake bite kits, although these have been somewhat discredited as to their usefulness. Outdoor guides will often bring simple splints in case of broken bones. A two-ounce emergency blanket for wrapping victims of shock or hypothermia in might be useful.

I combine my survival items with my first aid kit. The whole package is in a zippered pouch and weighs about four ounces. This may be a bit light, and a bit deficient by some standards, but it has worked well for me for decades now.

Perhaps it helps that I see the wilderness around me as an outdoor first aid kit. On various trips I have cured diarrhea, treated sunburn and insect bites, and disinfected cuts - all using plant materials. You'll see some tips on doing the same in many of the "Ultralight Backpacking Quick Tips" boxes.

Wilderness Survival Kit

What should be in your wilderness survival kit? It depends on the environment and season. Weight is also a concern for ultalight backpacking. Your kit could include some of the following possibilities (I combine these with my first aid kit).

Wilderness Survival Kit Items

Signal Mirror
Whistle
LED Light
Foil Blanket
Sun Block (Small packet)
Sewing Kit (Needle and thread)
Water Purification (Iodine or other tablets)
Waterproof Matches (At least 20)
Lighter
Candle
Tinder
Bullion Cubes (2 or 3)
Fishing Line (30 feet, 15# test)
Split Shot Fishing Weights (2, small)

Fish Hooks (2 or 3, size #4)
Compass
Orange Flag Tape
Knife
Nylon Cord (20 to 30 feet)
Plastic Bags (One small, one larger)
Zippered Plastic Bag (For water)
Bandana
Duct Tape (20 feet)
Paper
Pencil

Make Your Own Wilderness Survival Kits

There are good survival kits for under $100 that come more or less complete. You might just add one or two things for your own personal needs. Alternately, you can also put together your own wilderness survival kit, even making some of the items in it.

Your signal mirror, for example, can be a CD. They're highly reflective, with a hole in the middle for aiming. You can waterproof matches by dipping them in melted wax. You can make emergency fire-starters by soaking crumpled pieces of brown paper bags in wax (these will light when wet).

If you package many items yourself, you can also save money, space and weight. For example, you can wrap 6 feet of duct tape around your lip balm container instead of bringing a roll. Find tiny containers to bring small amounts of sun-block, pain killers, and iodine tablets. Cut a pencil down to the smallest usable size.

The whole kit should fit into a small plastic or nylon bag or pouch. For general backpacking, wilderness survival kits should be under a pound (my survival/first aid kit weighs 4 ounces).

No matter what else you include, there are some things that every backpacker should have in the pack or wilderness survival kit. There is are always differing opinions on what these "absolute essentials" are. Virtually all the lists include three things though: matches, a knife, and basic first aid supplies.

Key Points

1. A first aid kit should be suited to your personal needs and the environment you'll be in.

2. A wilderness survival kit should be suited to the place and season you'll be hiking in.

3. You should be able to keep a combined first aid/survival kit to less than a pound.

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Chapter Nineteen

Other Hiking Gear

This chapter is a collection of thoughts and advice on hiking gear and backpacking equipment which isn't covered in other chapters. I love technology, but you will see in my comments here that I don't care for it when it is all for show. I want usefulness and lightweight as my primary considerations when choosing gear - and perhaps low cost too.

Not sure where to find some of the gear listed here? There is a list of good hiking gear suppliers at http://www.TheBackpackingSite.com. It is on the homepage, and is organized by item.

Specific Hiking Gear Ideas Or Advice

Knives

I have no doubt that there are expensive knives that are better than what I use. My little $7 pocket knife, however, weighs less than an ounce, and I have used it many times to cut and carve walking sticks, as well as for food preparation. I have never had a blade break.

How much weight savings and better performance would I get for another $70? Not much. If you want to keep it light, I suggest buying a tough, inexpensive little knife with a two or three inch blade at any sporting goods store. Don't go over two ounces.

Other Tools

I find that a knife is enough. Some people swear by their multi-tools or Swiss army knives, but I just haven't ever seen a use for a corkscrew in the wilderness (wine is too heavy - bring rum). With practice, you can use knife where you might like scissors, and pliers... what for?

Lights

The most dependable lights I've used are lightweight LED lights. My first was called the "Photon Light," and cost $20. I think the little key chain ones in some drugstores now for $3 are the same thing. They run for 12 or more hours on a watch battery. At less than an ounce, light weight is their primary virtue. They aren't very bright, but I have climbed up mountain trails in the dark using them.

LED headlamps are great if you'll actually be traveling in the dark at times. These are not quite as light, because they often have two lights, and have headbands. I have one that weighs just two ounces, though, and newer models are getting even lighter.

Pack Covers

I don't use a pack cover. It is just too much extra weight. Most packs are relatively rainproof now in any case. It can help to put the contents of your pack into several plastic bags, just in case the pack leaks. This will add about an ounce - much less than any pack cover.

Ultralight Backpacking Quick Tips

Caffeine can be okay. Contrary to what many "experts" say, caffeinated drinks do not dehydrate you. If it was true, some people I know would have died years ago at their desks. The truth is that coffee, tea and other drinks with caffeine just don't hydrate you as well as water. Drink some water also, and you'll be fine. The caffeine in that coffee will make your aspirin work better too.

Need an emergency whistle? The pith can be pushed out of the branches of elderberry bushes (genus sambucus) to hollow them out. These are often made into whistles by kids. Don't suck on them, though. Elderberry can be somewhat toxic.

Don't put tents in the washing machine. It is too rough on them. You can wash it in the bathtub, but it may be even better to set it up outside to wash it. That way you can also let it dry properly.

Whistles

A whistle can be a good thing to have in an emergency. If you bring one, make it a simple plastic one. If it weighs an ounce, you bought a heavy one.

Radio

I would never bring a radio. On the other hand, if you really think it will add to your trip, look for one of those little ones that attach to your belt and have a tiny ear plug. They weigh less than two ounces.

Hiking Gear To Avoid

If you really want to go light, avoid anything that is just "gimmicky," and doesn't add any substantial convenience or value. In this category I would include seats, reflector ovens, forks, coffee pots, neck coolers, binoculars, chemical hand warmers, electric socks, thermos bottles, cups, thermometers, towels, shaving mirrors, tents, and sleeping bags. Okay, those last two are a joke.

I'm not saying you shouldn't ever bring anything extra. If you are an amateur meteorologist, you would bring that thermometer. If the woman who gave you the electric socks is along for the hike, you might even have to bring those. Just give some thought to each item before adding it to your list.

Key Points

1. Be sure it is useful, and not just interesting, before adding it to your packing list.

2. Keep your hiking gear lightweight.

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Chapter Twenty

Wilderness Survival

Why should you learn wilderness survival skills just for backpacking? Maybe you shouldn't. It's true that such skills could save you life someday, but if you are always close to roads, and with a group of experienced backpackers, you'll probably be fine without any special knowledge.

If you are an ultralight backpacker, however, wilderness survival knowledge can be very useful for two reasons. First, as mentioned, it can save your life. This is especially true if you backpack alone, or go far into the wilderness. Knowing how to stay warm after your down sleeping bag becomes soaked and worthless, for example, can prevent you from falling victim to the number one cause of death in the woods: hypothermia.

Using Wilderness Survival Skills To Reduce Weight

The other thing that makes wilderness survival skills so useful, is that they can help you reduce your pack weight. These skills can replace some gear directly. For example, if you know how to start a fire under any circumstances, you could leave the stove behind.

However, the primary way that wilderness survival skills can help you reduce weight is by making it safer to go with lighter options. You might not normally risk using a one-pound sleeping bag rated for 40 degrees Fahrenheit if the temperature might go below freezing. With knowledge of how to stay warm, however, it becomes a safe option.

I'll often go light on the food I pack, because if I need more calories I know which berries I can eat. I might leave behind my walking stick, because I can make one if necessary. I also might go a little light on my clothing, because I know that if there is unexpected cold weather, I can warm up with a fire, or use cattail fluff to better insulate my jacket.

This latter solution (insulating with cattail fluff) isn't something I have had to do. The point is that if you are going to go light, this knowledge makes it safer. With good skills and knowledge, a potential emergency becomes just an inconvenience. I will risk an inconvenience to go lighter and enjoy my hiking more.

Are there any other reasons a backpacker should learn about wilderness survival? Well, I can tell you that it's a good feeling to know you can deal with whatever comes up. It makes the wilderness feel more like a home. It's also just interesting knowledge for some of us.

Ultralight Backpacking Quick Tips

To extend the life of your backpack, air dry it well after using, and store it in a cool dry place. Sunlight deteriorates nylon and many other fabrics, so also keep it out of the sun when you aren't using it. Reinforce loosening seams with a few stitches before they start to tear loose.

Hiking in the arctic? In all the survival literature, I can't find one example of a poisonous berry in arctic regions. If there is one, it probably tastes bad anyhow. You can experiment with any good tasting berries in an arctic survival situation. See the page on Arctic Survival (http://www.the-ultralight-site.com/arctic-survival.html) on the Ultralight Backpacking Site for full descriptions of a dozen arctic food plants.

For a camp clothes line, double and twist a piece of cord, then tie it between two trees. The twists will work like clothes pins to hold your clothes.

What Should You Learn?

To learn a lot more about survival, visit the Wilderness Survival Guide on The Ultralight Backpacking Site: http://www.the-ultralight-site.com/wilderness-survival-guide.html. If you aren't sure you want to invest the time to learn much, at least scan the *Ultralight Backpacking Quick Tips* found throughout this book. They are full of little survival lessons.

Anything you learn is better than nothing (unless it gives you a false sense of confidence). Suppose you just read once and remembered that a pile of dry grass can be as warm as a sleeping bag. This could save a life, right?

Wilderness survival means staying warm and dry, hydrated, uninjured, and finding your way out of the survival situation. Eating can also be nice, but it's not normally crucial if the situation is for a few days (unless you are diabetic). Below are some basics you should concentrate on as you scan the *survival guide* or *quick tips*.

Learn How To Stay Warm

The number one cause of death in wilderness survival situations is hypothermia. How to stay warm, then, is the first thing you should study. This includes the following skills:

- Staying dry.

- Starting a fire.

- Making shelters.

Learn How To Find Water

Water far more important than food. People have gone months without food, while few have survived more than a few days without water. Simple skills you can learn to obtain potable water include:

- Making a simple solar still.

- Reading the terrain to locate water sources.

- Filtering and decontaminating water.

Learn How To Find Food

This will not be your top priority in a survival situation. However, once you have shelter and water, you will fell much more motivated with food in your stomach. You should learn about:

- Simple animal traps.

- Survival fishing techniques.

- The most abundant wild edible plants.

Learn How To Treat Injuries

Injuries in a wilderness emergency can range from cuts to burns, and broken bones to concussions. Learn a little bit about how to:

- Save lives with CPR.

- Treat shock.

- Treat common cuts and burns using a few common plants.

Learn How To Navigate

Someday you may be lost and need to find your way out of the wilderness. You may have lost or broken your compass. You should know how to:

- Navigate using stars.

- Navigate using the sun.

- Maintain a heading in rough terrain.

Key Points

1. Learning wilderness survival skills makes wilderness travel safer.

2. Survival knowledge can be used to reduce pack weight.

3. There are basic skills, like how to stay warm, that can be learned quickly.

4. Learning even a little about wilderness survival is better than nothing.

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Chapter Twenty-One

Water Purification

Backpackers have many water purification options to choose from now. They can be broadly classified in four categories.

1. Water Filters.

2. Chemical treatments.

3. Boiling the water.

4. No treatment at all.

I only mention the last one because Ray Jardine and his wife apparently have had success learning to recognize and use "safe" natural springs versus contaminated water sources. Either that or they have developed an immunity to various micro-organisms. I don't really recommend this as a way to obtain good drinking water, but it can't hurt to learn how to find the natural sources that are most likely pure. A filter can clog or your water tablets get lost.

Rainwater collected in clean containers or in plants is usually safe for drinking. This is just something to remember for emergencies, though. Always purify water from lakes, ponds, swamps, springs, or streams. Even deep in the wilderness, most water sources now have Giardia or other unhealthy bacteria and viruses.

Water purification by boiling works fine. Just boil for a minute or two and you are usually okay. The problem is that it is just too much trouble for backpacking. Do you want to stop several times daily to set up your stove and boil enough water to fill your water bottles? Do you want to always need a good fire to do the same, or to carry the extra fuel for that stove?

For regular use, there are just two convenient ways to purify water when backpacking. They are water filters and chemical water treatments.

Water Purification Using Filters

There are more water filters than I can keep track of out there. Some have ceramic filter cores, some use other materials. Some add a carbon filter to improve taste. Some combine chemical treatment with filtering. Pore size is another feature you'll see advertised, with some saying they will filter down to .3 microns. How do you choose?

First, let's look at some of the problems with filters:

- They weigh too much. Many weigh a pound or more, and even more after the first time you use them, because of the water trapped inside.

- They are complicated. Many require assembly

- They are expensive. I'm not just talking about the initial cost of the device

- They don't work as promised.

- They are a hassle.

- They can break.

Despite all these problems, you may need a good water filter for water purification. Here is what ultralight backpackers should look for in one:

- Light weight. Try for 12 ounces or less.

- Easy to use. Ask others about their water filters.

- Tough. Does the pump handle look or feel like it will break when you pump it?

- Easy to find replacement filters. Don't buy model closeouts that won't have filters available.

- Low cost per gallon of treated water. Divide the cost of a filter by the number of gallons it is good for. This may matter more than the initial cost of the device if you plan to use it much. I think that more than 60 cents per gallon of treated water is too much.

There are other water purification devices being invented all the time. There are water filtering "straws," for example. They weigh less than an ounce and will purify enough water for a week-long trip. There are UV light purifiers. There are combination filters that also use chemical treatment. In other words, this a quickly developing area.

Note: When you use a water filter, you should carry a separate plastic bag for the intake line. This is "contaminated" each time it goes into a stream or lake, and you don't want that water on it to drip onto the output line or other parts of the filter.

Ultralight Backpacking Quick Tips

Does alcohol lead to hypothermia? "Experts" make it seem like a beer in the wilderness is a terrible thing. The truth is more complicated. Alcohol dilates capillaries and sends blood to extremities, causing you to lose heat more quickly, thus possibly contributing to hypothermia. However, the same effects can prevent frostbite in fingers and toes - a good option if you know you'll be in a warm place before hypothermia set in. Experts try to protect you with simple rules, assuming that the one thing you won't do is THINK.

Thistles (genus cirsium) have seed-fluff that can be used as insulation. Pull it loose as you walk, fill a couple bread bags with it, and you have simple mittens. Remove any seeds for maximum loft.

Keep your stove clean to make it last longer and burn most efficiently. In particular, watch to see if the flame is coming from all jets. If not, clean out these tiny holes with a pin.

Chemical Water Purification

I don't own a water filter at the moment. I use iodine tablets. I would probably use any of the many other good water purification pills and liquids if they were as cheap. Why do I prefer chemical treatment?

Chemical water purification is simple. There are no pump parts to break, filters to clog, or extra filters to carry because one is about to reach its limit. It is also a matter of weight. A bottle of iodine pills weighs less than an ounce.

If you don't like the taste that iodine treatment gives to your water, try one of the products that includes "neutralizer tablets." These are added after the iodine treatment is complete, and they take away the bad taste. If you want to save the expense, use regular iodine and add vitamin C powder, or drink mixes that have Vitamin C in them. Always wait until the water is purified before adding anything.

General Procedure

Add the chemical treatment to the water. Shake it up. Let some water and chemical leak through the threads of the water bottle so they are treated too. Let the water sit for 30 minutes before drinking.

Effectiveness of chemical treatments is related to the temperature and clarity of water. In general, dirty water needs more chemicals, and cold water needs more time for purification. If water is particularly muddy or cloudy, let it settle and pour off the cleaner water for use. You can also try straining it through cloth before treating it.

In tests, at 50 degrees (10 Celsius), just 90 percent of Giardia cysts were inactivated after 30 minutes of chemical treatment. With water below 40 degrees (4 Celsius), double the treatment time before drinking. For best results, water should at least 60 degrees (16 Celsius) before treating. Warming water in the sun can speed up the purification process.

Other Considerations

- Iodine should be stored in dark bottles.

- Iodine is better than chlorine-based treatments in inactivating Giardia cysts.

- Some people are allergic to or sensitive to iodine.

Key Points

1. Water purification using filters and chemical treatments are the most convenient ways.

2. Look for light, easy-to-use, tough water filters.

3. Chemical water purification may be simpler, and is certainly lighter for backpacking.

4. Use filters and chemical treatments carefully, or they may not work.

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Chapter Twenty-Two

Drinking Water

How much drinking water do you need? How should you carry it? That is what this chapter is about.

It is sure to annoy some backpacking gear manufacturers.

First, how much water do you need? This has no simple answer. Your fluid requirements will vary greatly depending on the environment you are in and what you are doing. Backpacking in the Arizona desert, you may be drinking two gallons of water per day. Camping in cooler locations, and not hiking much, you could get by on a fourth of that.

Bottom line? Drink as much as you need. If you are very thirsty, or your urine is very yellow, you probably should be drinking more. The important question is this:

How much drinking water do you need to carry to safely and conveniently get you from one water supply to the next?

You see, unless you are just day hiking, you will never be carrying all the water you need for a trip. You will be refilling at lakes, streams and faucets, or melting snow. What you need to know then, is how much to carry so you won't run out between these points.

If you are hiking a chain of lakes, you could get by with one water bottle that holds just sixteen ounces. If,on the other hand, you are hiking in a desert, where there may be a full day between drinking water sources, you may need to carry two plastic gallon jugs of water. Estimate how far you will travel between the two furthest-apart water sources during your trip. Then figure how much water you need for that and add more for safety. This will tell you what your water carrying capacity should be.

Ultralight Backpacking Quick Tips

Avoid making fires on soils that aren't mostly minerals. Roots have been known to catch fire from simple campfires, and burn underground for days. Under the right conditions, the fire can then resurface and start forest fire.

Hiking in the arctic? Here's a quick survival tip to keep in mind: In all the stories of arctic survival I have read, bird eggs seem to be one of the most common saviors of people lost in the arctic. There are no trees for the birds to nest in, so collecting eggs isn't usually too difficult. Of course, you have to be there at the right time of the year.

UV radiation from sunlight destroys nylon over time. Don't leave your tent set up in the yard for days. If you spend a lot of time camping at high altitude (where UV rays are strongest) you may want to coat the tent's rainfly with a UV blocking treatment.

Drinking Water Containers

In several decades of backpacking, I have never heard a backpacker say, "My plastic water bottle broke." Why is this relevant? Because I have heard many complaints about broken "hydration systems" and leaky valves and "water bladders." These devices have their place for runners or other athletes, perhaps, but for backpacking, they are just technological toys.

Let's review the problems with water bladders:

- They are heavy: Even the lightest weigh more than simple plastic bottles.

- They are hard to clean: They even sell cleaning kits for them (one more thing to carry).

- The bladders get punctured easily.

- The valves break.

- They require special backpack pockets to use them properly.

- They are expensive.

Bottom line: There are better ways to carry your drinking water. More precisely, there is one better way - simple plastic bottles. More on that in a moment.

There is one other water container worth mentioning. It is the plastic bladder from a box of wine. They hold about six liters, and weigh less than three ounces. They cost less than regular backpacking water bladders, and come with five liters of wine as part of the price. If you drink wine anyhow, they effectively cost you nothing - that makes it less painful if they break.

They are tough, however. I have inflated and jumped on them without breaking them. They can be punctured, of course, and I would always carry a simple plastic bottle as a back-up.

One other advantage is that they can be used as a pillow. Just inflate one halfway with air. Put it inside a sweater and it is pretty comfortable. Or, to cool off in the summer, you can use it as a pillow while you still have your drinking water in it.

Water Bottles

Simple plastic water bottles have none of the problems associated with water bladders or "hydration systems." Whether they start life as a pop bottle, sports drink bottle, or water bottle, they are perfect for carrying drinking water when backpacking. What are the advantages?

- They are light. A one-liter plastic bottle weighs about an ounce.

- They are tough. I have yet to break one.

- They are simple. No valves or hard to clean bladders.

- They are cheap. Buy one for a dollar, and you even get the pop that comes with it.

- They come in all sizes. You can find simple plastic bottles from 8 to 128 ounces capacity.

What should you look for? Wide mouths are an advantage for easier filling. Try to avoid sports-bottle nipples and such. They get dirty, and they open in your pack. Simple screw-on caps are better. Don't bother with those thick, white plastic water bottles sold for hiking. They impart a plastic taste to the water, and have no advantage over simple pop bottles (okay, they are better for hot liquids).

I like to carry two water bottles, so one is usable while the water in the other is being treated.

Usually, I'll carry a one-liter bottle and a half-liter bottle. Although I have never seen a plastic water bottle break, having two bottles does provide a measure of safety just in case one does break.

While researching this chapter, I went to a backpacking forum and found a thread on containers for carrying drinking water. Several members said they have never found anything better than simple plastic bottles. Only one backpacker was thrilled by his most recent water bladder. Of course, he had bought it because the last two he owned were punctured while out in the wilderness. Point made?

Key Points

1. Your drinking water requirements vary according to environment and activity.

2. You should determine how much water to carry to get from one water supply to the next.

3. Water bladders and "hydration systems" have serious flaws for backpacking.

4. Simple plastic water bottles are the best way to carry water.

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Chapter Twenty-Three

Backpacking Food

Backpacking food doesn't necessarily need to be light. You can find your weight savings in other areas if you want, and even bring heavy foods like fresh fruit and vegetables. The real point is to bring what works for the type of trip you take, and bring what you personally need to enjoy the trip.

Backpacking food doesn't necessarily have to be healthy. On a trip in the Sierra Nevadas, I once ate 60 granola bars in five days with no ill effects. It kept my pack light (I had no stove), and was very convenient. Of course, since I supplemented my food with berries and other wild foods, it probably wasn't all that unhealthy - for a short trip. Naturally, the longer the trip, the more important it becomes to bring healthy foods.

We *are* all different in our needs. I don't need cooked meals to be happy, but you may. There is no one-size-fits-all solution to the question of what kinds of backpacking food to bring. You have to balance for yourself the issues of weight, health, taste, and cost. The following are some important factors to consider in doing this.

The Lightest Backpacking Food

The lightest food is generally that which has the most calories per ounce. Pure fat wins by this measure, followed by high-fat foods (butter), low moisture carbohydrates (granola bars), concentrated proteins (beef jerky), and then bread, fruit, vegetables, etc. For example, nuts have 50% more calories per pound than pure sugar, because of their high fat content.

Note: *See the guide to calorie counts of the most common backpacking food items at the bottom of*

the page.

Even if you are trying to go as light as you can, this doesn't mean you should subsist on stick of butter. You have to have something besides calories - like vitamins, fiber, protein, and enough variety to keep you happy. Still, even if you need cooked meals, healthy foods and want every meal to be different, there are ways to reduce weight.

Start looking at the information on the labels. Find many healthy foods you like, and then from those choose the ones that are higher in calories for their weight. In this way, you get the variety and tastes you want, you get what your body needs, and you keep it light. I like to first get all the lightest foods that will be relatively healthy, and then maybe add a treat or two.

How much food do you need to bring? This depends, of course, on your metabolism, your plans, and the time of year (you'll burn more calories in winter). For most trips, I plan for about 3000 calories a day. I'm 6'3", and 165 pounds. This may not be enough calories, but it's no disaster to lose a pound or two on a weekend trip (it comes back quick enough).

What does this mean in terms of pack weight? That depends on the foods you choose. With high-calorie foods like tortilla chips (2100 calories per pound) and mixed nuts (2700 calories per pound), I can get by with about 20 ounces of food per day. This means that for four days of backpacking I'll carry around 5 pounds of food.

To reduce the amount of food you carry, you can also eat a big meal before you leave. You'll be carrying the weight of the meal inside you, of course, but at least it will be centered instead of on your back. Athletes use a technique called carbo-loading, which involves avoiding carbohydrates for several days, and then pigging out on them the day before an event. This causes your liver to store up to a couple pounds of carbs, ready to used. This is for the fanatical ultralight backpackers.

You can cut weight if you know which berries and other foods to eat along the trail. I've eaten 500 calories in raspberries during a break while hiking in Colorado. Fishing can supplement your backpacking food as well, if you enjoy doing that.

Ultralight Backpacking Quick Tips

In addition to aspirin or other pills, consider DMSO for regular pain in your shoulders, neck or back. You can find this liquid at stores which sell natural treatments. Carry some in a small plastic container. It penetrates and gets into the muscle so quickly, and into the blood where it is released in the lungs, that you may get a garlicky taste in your mouth less than a minute after rubbing DMSO on a sore muscle .

Out of mosquito repellent? The leaves of elderberry bushes (genus sambucus) can be used for an insect repellent. They are crushed and rubbed on your body or placed in your clothing. Carry uncrushed ones for later use too.

Tyvek, a house-wrap you can find wherever they sell construction supplies, is waterproof and breathable. It can be used to make a bivy sack, as a tarp, or as a groundcloth. Run it through the washing machine to make it soft and pliable.

Healthier Backpacking

Try this routine to stay healthy when backpacking. First, try to at least bring foods that aren't too *unhealthy*. Then, just before you leave, eat a good salad. Eat another healthy meal right after you get back. If also eat some berries and herbs along the way, you can concentrate on bringing only light backpacking food, and your health shouldn't suffer.

A more obvious alternative, is to spend some money. With enough money, you can feast on backpacking foods that are nutrition-packed and calorie rich. These include bee pollen, spirulina, raw nuts and seeds, molasses, dried papaya - I could go on, but you get the idea.

Backpacking Food Calorie Counter

Below are some backpacking foods, along with their calories-per-ounce. You can simple multiply by 16 to get the calories-per-pound. While any food can be brought on a lightweight trip, by balancing out low-calorie foods with high-calorie ones, you can bring the foods you like, while keeping your food weight to less than two pounds per day.

Almonds.....165
Beef Jerky..... 70
Bread..... 70
Cereal.....110
Cheese..... 80
Chocolate.....140
Cookies.....130
Crackers.....110
Fruit..... 20
Fruit, dried..... 90
Granola.....110
Noodles.....110
Nuts, mixed.....170
Olive oil.....240
Pasta.....110
Peanuts.....160
Peanut Butter.....160
Potato Chips.....150
Raisins..... 90
Ramen Noodles....130
Snickers Bar.....140
Sugar.....110
Tortilla Chips.....150
Vegetables..... 10
Dried Vegetables.... 70

You may have noticed that I haven't mentioned freeze-dried foods. They can be delicious, but I don't like to cook, and I don't like to pay restaurant prices for a meal on the ground. Other than those two problems, and the fact that with the over-packaging they are often heavy, I have nothing against them.

Key Points

1. If the food is one of the most important parts of the trip, find your weight savings elsewhere.

2. You can find ways to carry less weight, even with healthy and tasty foods.

3. With backpacking food, lightweight generally means that which has more calories per ounce.

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Chapter Twenty-Four

High Altitude

My first high altitude experience was going to the top of Mount Shasta (14,179 feet) in California. My head was pounding like someone was knocking on a door, and this continued for hours. After I made it to the summit and began to descend, the pain went away. This is a clue to the primary treatment for any altitude related problems: go lower.

High Altitude Illnesses

AMS or acute mountain sickness: Common when going above 10,000 feet (3000 meters) without proper acclimatization. Symptoms include headache, nausea, weakness, shortness of breath, vomiting, and problems sleeping.

HAPE or high altitude pulmonary edema: Rare below 8,500 feet (2,500 meters) More common with younger (under 18) hikers and persons who have had the problem before. Symptoms develop 24 to 60 hours after arrival at high altitude, and include coughing, shortness of breath, weakness, headache, rapid heart rate, and progress to constant coughing, bloody sputum, fever and chest congestion. Crackling sound in chest, resting pulse rate of 110 respirations per minute, and respirations over 16 per minute are early signs of HAPE. Death is usually within 12 hours after coma starts.

CE or cerebral edema: Less common than AMS or HAPE, but more dangerous. Rare below 11,500 feet (3,500 meters). Symptoms include increasingly severe headache, instability, mental confusion, hallucinations, loss of vision, facial muscle paralysis, loss of dexterity, restless sleep followed by coma and death.

Altitude Sickness Treatments

Climbers who intend to travel at high altitude should ask a doctor about the latest recommendations for medicines to take. For backpackers and others who primarily pass through high altitude for short periods of time, aspirin will help most headaches. The primary treatment for all altitude problems is to go lower. Often a descent of just 2,000 feet will resolve any problems, but in general, just keep going lower until the problem is resolved.

Swelling of the fingers is common at high altitude as well. This requires no treatment, and will usually go away when you descend. Increased gas and flatulence is a problem at altitude as well. Eat fewer foods that cause gas to avoid this problem.

There is many anecdotal reports of people having an easier time at altitude if they take ginkgo biloba supplements, or eat ginkgo leaves. There is little danger in trying this. The supplements are cheap and without side effects for most persons.

Another thing to remember is that the higher you go, the worse your ability to digest food gets. Try to stick to easy-to-digest foods like simple carbohydrates while you are above 10,000 feet.

Dehydration can cause headaches and other symptoms similar to high altitude illnesses. Often water supplies are rare or inconvenient at altitude (setting up the stove to melt snow repeatedly). Add to that the fact that you won't feel as dehydrated in the cooler air, and it is easy to forget to drink enough. At least start fully hydrated before going high up, and have your water bottles full.

Ultralight Backpacking Quick Tips

If bears or other animals are a problem where you will be backpacking, consider cooking and eating all of your meals along the trail, before you stop for the night. This will reduce any animal-attracting food odors coming from your campsite.

Horsetails, also known as scouring rush (genus equisetum) contains silica crystals. It has been used for scrubbing pans, polishing things, and even as a sandpaper substitute. Look for the segmented 6 to 16-inch stalks in low areas.

To keep your sleeping bag dry in rainy weather hiking, be sure that the stuff sack is waterproof. If not, line it with a small garbage bag. It will add just a half-ounce, and is cheaper than getting a new stuff sack.

High Altitude Acclimatization

I just read a wilderness medicine guide that suggested an ascent rate of only 1000 feet per day above 7,000 feet (2,000 meters). This may work for some on long-term expeditions at altitude, but it is unrealistic for general backpacking. By this rule, I should have taken 12 days to go from Riobamba Ecuador, at about 8,000 feet (2,500 meters) to the top of Mount Chimborazo at 20,600 feet (6,000 meters), instead of the 12 hours I took.

How fast should you ascend? It partly depends on what elevation you are starting at. It is certainly easier for me to run up to 14,000 feet now that I am living here in Colorado at 5,000 feet, than it was when I lived near sea level in Michigan. In other words, I am already partly acclimatized.

As another example of acclimatization, or a lack of it, consider a trip I took years ago. I traveled from Michigan to Silverton, Colorado, and immediately went to the top of a 13,000-foot mountain. Then I camped at 11,500 feet, and woke up nauseas, with a headache and almost hallucinating. In the morning I descended to about 10,000 feet and soon felt just fine.

I was backpacking above 10,000 for the next week and never had any other problems with the altitude. I even went to the tops of five 14, 000-foot mountains along the way. The point is that it isn't easy to say what it takes for an individual to acclimatize (a 1,000-foot-per-day rule would have meant canceling the trip). More important than a rule, is to pay attention and go lower if you have any symptoms of high altitude illness.

Fast Or Slow

Back to the example of my fast ascent of Chimborazo. The key here was to get up fast and down again just as quickly. I also would have been okay if I took four or five days to gradually acclimatize. However, if I had taken two days to climb the mountain, I probably would have been sick to the point of dying.

Fast means getting back down before the symptoms of high altitude sickness can become serious. Slow means getting your body accustomed to the altitude so you don't get sick. Somewhere in between is the most dangerous way.

Other Dangers

There are other dangers that come with high altitude travel. Hypothermia is common, because of the cold and lack of shelter from the wind up high. Injuries are both more common because of the terrain and more serious because of the isolation. Lightning strikes are more common as well. Each of these will be covered in other chapters.

Key Points

1. High altitude can make you sick in several serious ways.

2. There most important treatment for altitude sickness is to go lower.

3. Ascend and descend fast or slow, but be careful in between.

4. Other dangers of high altitude include hypothermia, lightning and injuries.

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Chapter Twenty-Five

Hypothermia

Hypothermia is a lowering of body temperature, but there are two types. There is the more common chronic type, and the acute type. Why is this important? Walking or other exercise might help you with the former type, while it could kill you if you have the latter.

Chronic Hypothermia Symptoms

This is the type of hypothermia most likely to afflict backpackers and hikers. It is the gradual lowering of body temperature. Shivering is a symptom, and becomes worse until the core temperature of the body is down to about 90 degrees Fahrenheit (32 Celsius). If the body cools beyond that, shivering will usually stop, and a hospital is an absolute necessity for safety.

Other symptoms include inability to do complex tasks with the hands, and general loss of coordination. A victim may have a hard time talking as the cold gets worse. A good filed test for

early hypothermia is to try to walk a straight line for thirty feet. Inability to do this means possible hypothermia.

Treatment

Treatment involves stopping further heat loss and allowing the body to start rewarming itself. Start by getting out of the wind, and out of any wet clothes. Get in shelter if possible, or stand in front of a roaring fire.

If this isn't possible, have one or two people "cuddle" with the victim in a sleeping bag. The rescuers should remove most of their clothing, so their body heat conducts easily to the victim. If there are only two others, they can take turns with the victim, so one can be preparing a fire, hot liquids or food.

In cases of mild hypothermia, you can walk or otherwise exercise to create heat - but only if you have enough energy. If you exhaust yourself, it may be even more difficult for your body to warm itself. Walking around a fire while drinking hot liquids or eating soup may work. Just getting into a sleeping bag may be enough in mild cases too.

Ultralight Backpacking Quick Tips

Backpacking food tends to be less than ideally healthy. Fresh food weigh too much to carry. Here's a solution for short trips: Eat a good salad right before you leave, and right after you get back. If you then also eat some berries and herbs along the way, you can concentrate on bringing only light backpacking food, and your health shouldn't suffer.

Do you have joint problems from arthritis? If it gets too bad, catch a bee. Many doctors are now using bees to treat patients with painful joints. Hold a bee or two against your skin at or near the joint, and let it sting you. People swear by the relief provided from this. Of course, if you are allergic to bees, you may die, so ask your doctor about this.

Duct tape is great for a variety of purposes, from covering "hot spots" to prevent blisters, to patching a hole in a tent. Don't carry a roll, though (too heavy). Just wrap some around some other item, like a lip balm container, or below the handles of your trekking poles.

Acute Hypothermia Symptoms

This type of hypothermia usually occurs from being in cold water. As a general rule, a person who is in water below 50 degrees (10 Celsius) for 20 minutes will suffer from a severe heat loss. However, unlike with chronic hypothermia, the loss of body heat will be concentrated more in the extremities and outer layers of the body.

If the victim starts to move around, the blood brings that coldness to the core of the body. This is called "afterdrop," and is very serious. The victim may come out of the water with an almost normal core temperature, and then after moving around, suddenly have heart failure from the rapidly dropping body core temperature.

I once read an account of six sailors that fell in the North Atlantic. They were rescued by a passing

boat, and seemed normal. They even sat down to eat with the crew and were talking and joking. All of them died shortly afterwards as the afterdrop caused their hearts to fail.

Treatment

Treatment starts, then with not letting the victim move around or otherwise increase their heart rate. Submersion in hot water (110 degrees, 43 Celsius) is considered an ideal treatment, but usually won't be possible in the wilderness. Sitting still by a hot fire can help. Huddling with a naked warm person in a sleeping bag is also a common lifesaver.

In all cases where the victim doesn't respond to treatment, hospital treatment should be the goal.

Avoiding Hypothermia

There are many true stories in books and outdoor magazines that involve hypothermia. If you have read some of them, you may have noticed that one of the most common factors is getting wet. Staying dry, then, is the first key to avoiding hypothermia.

Try not to fall in that lake, and put on a rain suit when it rains, of course. Remove your socks and roll up your pants if you need to wade across a stream. If you will be passing through bushes that are wet with dew or past rain, put the rain suit back on.

Wetness doesn't always come from outside, though. I have often hiked up a mountain sweating heavily, only to arrive on the cold windy peak wet and soon cold. The key here is to carefully monitor your perspiration, removing and adding clothing as you get colder or warmer so you sweat as little as possible. If the cold is hard on your skin, but your exertion has you sweating anyhow, try stripping down to a t-shirt or no shirt while putting on a hat and gloves to protect sensitive areas.

Exhaustion also contributes to hypothermia. You need to have reserves of energy for your body to effectively heat itself. This means eating enough and not pushing yourself too hard on the trail.

Think ahead to prevent hypothermia. If you have a pair of wet socks, hang them from your pack to dry, in case you'll need a dry pair later. If you know you won't have a fire later, be especially careful to stay dry. Watch the weather report before you go backpacking, so you can bring what you need.

Key Points

1. Hypothermia is a loss of body heat.

2. There are two types, with important treatment differences.

3. There are simple ways to avoid hypothermia.

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Chapter Twenty-Six

Frostbite

Frostbite is a freezing of the skin and deeper body tissues. There are varying degrees, but the treatment is similar for all of them. In any case, the real degree of the frostbite usually won't be known until after it is treated and the damage can be determined.

Frostbite Symptoms

The first sign of frostbite may be a loss of feeling in the affected area. White patches on the skin are the next obvious symptom. Watch for a white tip of the nose. The skin will appear pale and waxy. The fingers may even clack together like pieces of wood in serious cases.

Frostbite Treatment

Quick rewarming of the affected areas is the usual treatment. This can be as simple as putting your frostbitten fingers under your arms in mild cases. In more serious cases, the treatment of choice is hot water. Frostbitten toes can be effectively warmed against the bare stomach of a good friend.

Refreezing of thawed body parts can cause substantial tissue loss. Therefore it is important to not only treat the affected areas, but to have a plan for protecting them from the cold thereafter. For this reason, there are times when it may be best to leave the affected parts frozen.

One such instance is when a foot is seriously frozen, but is needed to walk to safety. Thawing it out before you can easily keep it thawed not only might result in more damage, but a thawed foot may be impossible to walk on due to the pain. More than one person has had to leave a foot frozen in order hike out to safety - even when this has meant the loss of the foot.

Superficial frostbite, on the other hand, such as when you see white patches on your nose or fingers, should be treated quickly. This may prevent deep tissue damage.

The hot water treatment for more serious frostbite is a generally done with a water temperature of 110 degrees (43 Celsius). Thawing continues until color returns to all of the affected parts (about 20 to 30 minutes), but not much longer. It is extremely painful, so strong pain relievers are normally required.

Blisters will form, and generally shouldn't be popped. They can last several weeks, and should receive attention from a doctor. Dead skin should generally not be cut away, and digits should be allowed to self-amputate themselves over the following three months.

Okay, with that in mind, let's look at prevention.

Ultralight Backpacking Quick Tips

To conserve energy on steep terrain, especially at high altitude, try the mountaineer's "rest-step." Before pushing up into the next step, rest a few seconds on your rear leg, with you knee locked, and take a deep breath or two.

Wild onions (genus allium) are one of the safer emergency foods, because their distinctive odor makes identification almost certain. If it smells and tastes like an onion or chive or garlic, it almost certainly is. Cook the bulbs if you eat large quantities, to make digestion easier.

To avoid excess condensation in your tent, open the rainflys on any screened windows or doors any time you can. Good airflow will prevent most condensation. You can always close them again if it starts to rain.

Frostbite Prevention

Stay warm - that is the essence of preventing frostbite. Know what kind of weather you'll be hiking in and be prepared for worse than what is expected. Think ahead and plan for how you will stay warm and get warm again if you do get too cold.

Stop to check for frostbite if you are not sure that you can feel some part of your toes, nose or fingers. Treat possible beginnings of frostbite quickly, and then watch for any repeat problems in that area. Put warmer socks on, cover your nose and do whatever else you can to keep your extremities warm.

Putting on a hat can help prevent frostbite in your toes. How? Any general conservation of body heat can make it easier for your body to keep the heat going to the extremities. A lot of heat can be lost through your head if you don't keep it covered.

Cayenne pepper sprinkled in your socks can keep the blood flowing to your toes, thus preventing them from freezing. It is said that rubbing vinegar on your hands and feet will do the same thing. DMSO, a pain-relieving solvent sold in some health food stores, also seems to work.

Immersion Foot

Immersion foot, unlike frostbite, can happen at temperatures up to 66 degrees (19 Celsius). It is a result of constant exposure to cold and water. First, the foot is swollen, cold, waxy, and with blue and purple blotches. The skin is wet and soft. Walking can become difficult due to a loss of feeling. Over the coming days, this progresses to swollen, red and hot feet. Blisters form and infection is common, as is gangrene.

Common treatments include aspirin and alcohol (small doses throughout the day), to keep the blood flowing in the smallest capillaries. Keeping the feet dry is important too. Prevention is a better plan. Foe this, change into dry socks frequently. Also elevate, dry and massage the feet several times daily to promote circulation

Key Points

1. Watch for any loss of feeling or white patches on the skin.

2. Early treatment of frostbite can prevent serious damage.

3. There are simple steps you can take to prevent frostbite.

4. Immersion foot is also a serious problem when temperatures are above freezing.

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Chapter Twenty-Seven

Thunderstorm Safety

Thunderstorm safety is a big issue for backpackers and hikers here in Colorado. A few weeks before I wrote this seven hikers were struck by lightning. One of them was rendered unconscious, and needed CPR to restart his heart twice. All of them took a trip to the hospital. A dog that was with them died from the strike.

The seven were on a mountain at an elevation of about 11,400 feet. It was approximately 2:30 in the afternoon. They had taken refuge from the storm under a solitary tree. The boy who was most seriously injured was leaning against the tree.

For some suggestions on treating those struck by lightning, see the chapter on wilderness first aid. This chapter covers *prevention* of lightning strikes and other storm-related problems.

Ultralight Backpacking Quick Tips

Air condition your tent: If the day is dry and hot, try wetting any large piece of cloth in the nearest stream and laying it over the roof of your tent. The evaporation can cool the interior of the tent by ten degrees. Just be sure that if you are using a shirt or other clothing that you'll be needing, to allow enough time before dark for it to dry completely.

Need a quick thirst quencher? Try thistle stems (genus cirsium). The varieties with thicker stems can be peeled carefully when younger, and eaten like celery. They are common high in the Rockies, and full of moisture. It is often easier to scrape off the spines with your knife (or the sharp edge of a rock) before you cut the stem. I like these almost as much as celery.

If you are backpacking in a group with more than one tent, consider bringing a lightweight tarp. Pitched over the space between two tents, it can provide a dry passage back and forth and a place to cook out of the rain.

Thunderstorm Safety Rules

There are some simple rules to follow if you want to be safe from thunderstorm-related problems. Of course, by "rules" I mean guidelines. Every situation is a little bit different, and you should never let rules excuse you from thinking for yourself. With that in mind, here the rules:

- Learn about the weather patterns. Afternoon thunderstorms are the norm here in the mountains. Experienced hikers and climbers usually try to reach the top of the mountain by noon, so they can be below tree line before the storms come. Notice that the hikers in the above story were still up at tree line at 2:30 in the afternoon.

- Avoid solitary trees. A lone tree is a lightning magnet. Get in a group of trees and stay away from the largest one.

- Don't touch lightning conductors. The most seriously hurt in the above incidence was leaning against the tree. Better to sit on your pack or a sleeping pad to insulate you from the ground, and don't get too close to the tree trunk.

- Split up your group. If you are spread out, there is a better chance that there will be some untouched by lightning that can help the others.

- Get your rain suit out before the heavy rain starts. I have seen the temperature drop twenty degrees in a matter of minutes during a thunderstorm. Hypothermia is a real concern, so stay dry.

- Watch for "widow makers." These are dead branches that are just waiting for a storm to make them fall - possibly on you! Don't stand under them and don't set up your tent under them.

Stories of people being struck by lightning are fairly common here in Colorado. It is a much more common occurrence than, for example, mountain lion and bear attacks put together. If the group above had followed any one of the first few rules, they probably wouldn't have been struck.

Key Points

1. Thunderstorms can be one of the biggest threats to hikers, especially in the mountains.

2. There are simple thunderstorm safety rules that if followed, will prevent lightning strikes and most other storm-related problems.

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Chapter Twenty-Eight

Bear Attacks

Bear attacks are not common, but they happen. What most people don't understand, is that there are two basic types of bear attacks. There is the "bluff attack," in which the bear is surprised or angry and just wants to scare you away. Then there is the rarer type, which I will call the "dinner attack." In these cases the bear actually intends to put you in his belly.

Bear Attacks - First Type

When you stumble upon a bear and surprise him, he is usually scared or pissed off. Either way, a

common response is for him to run away. Unfortunately, another response is for him to charge at you, and maybe even maul you.

Essentially he is trying to get rid of the problem - you! He or she wants to warn you and have you leave. The bear wants to be sure there is no threat - especially if her bear cubs are nearby. Common behavior in these cases includes growling, standing on hind feet, running at you and stopping just in front of you, or even swatting at you or biting you.

In these types of bear attacks, try the following:

- Talk quietly or just don't talk at all. The time for loud noises was before you encountered the bear. Try to detour around the bear if you can.

- Don't run! Try to back away slowly, but stop if this agitates the bear.

- Assume a non-threatening posture. This could mean turning sideways, or bending at the knees to appear smaller.

- Don't look straight at the bear. Bears may interpret direct eye contact as threatening.

- Drop something, like a water bottle or hat, to distract the bear. Don't drop food, however, or he may come to you looking for more. Leave your backpack on for protection in case of an attack.

- If you have bear repellent (pepper spray) get it ready. If the bear attacks, use it!

- If the bear makes contact, fall to the ground on your stomach, or assume a fetal position to protect your chest and abdomen. Lace your fingers together over the back of your neck. Don't move until you the bear has left.

Ultralight Backpacking Quick Tips

One of the most important principles of survival in cold weather is to always be thinking ahead. Have enough firewood, stop early enough to properly prepare camp, etc. It is difficult to do much once it is dark and you are cold. Plan ahead.

Out of insect repellent? You can rub yourself with the fresh leaves of the yarrow plant (achillea millefolium). It seems to work when I've tried it. Carry some leaves for later application.

Don't wash your sleeping bag too often. Washing machines - especially those with center agitators - are hard on bags. It is better to keep it as clean as you can to reduce washings. Drying it in the dryer, on the other hand, can fluff it up before a trip.

Bear Attacks - The Second Type

Bears sometimes attack at night or after stalking you. These attacks are very rare but very serious, because the bear is probably looking for food and preying on you. You don't want to follow the common advice of "playing dead" in these cases, or you will be dead.

The bear's behavior will be noticeably different in this type of attack. There may be no growling, for example, because he isn't trying to warn you away or scare you.Other scare tactics, like pawing the ground or standing on their hind legs will probably be absent too. Look for laid-back ears and eyes intently focused on you. If you are prey, the bear will steadily move in for the kill.

You need to escape or defend yourself. Use pepper spray if you have it. Stand tall and open your jacket to make yourself look bigger. Yell at the bear. Wave your walking stick at it, or throw something at it. Do whatever you can to convince the bear that there are easier meals to be had.

Try to escape, but don't turn and run. Also, don't crouch down to pick up a rock. These behaviors will trigger the final attack mode in the bear. Intimidate the bear with yelling, whistles, sticks or whatever while you back away and look for a chance to escape.

If it is a grizzly bear, you might try to climb a tree if you think you can get ten feet up before the bear reaches the tree. Most adult grizzlies are too large and their claws too dull to climb easily. Other wise, back up and try to get trees and rocks between you and the bear. Be aware that even if you don't see the bear at some point, he may continue to stalk you.

Avoiding Bear Attacks

Number one rule: Don't surprise bears! This makes them dangerous. In Glacier National Park, for example, people have been charged and injured by bears fleeing from silent hikers who surprised them along the trail. Even if bears haven't been seen along a trail section recently, don't assume there are none present. You can't predict where and when bears might be encountered.

How do avoid surprising bears? Wearing "bear bells" is one way. Calling out occasionally, or clapping your hands loudly at regular intervals may work. You may also want to have a good loud conversation if you are not alone (or even if you are).

Hiking in groups is always safer. Bear attacks on groups of people are rare. Hiking in the middle of the day is safer too. In the national parks, you can ask the park staff about the trails you'll be hiking, and they can tell you about any recent bear activity, and what you should watch for.

How common are bear attacks? They average a couple per year in Glacier National Park, which sounds bad until you realize there are over a million hikers there each year. Be careful, and the chances are slim.

Key Points

1. There are two types of bear attacks.

2. You need to know which type of attack it is to properly respond.

3. There are simple ways to avoid attacks.

4. Bear attacks are relatively rare.

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Chapter Twenty-Nine

Mountain Lions

There had been mountain lions strolling along the fence looking at the children in the playground on the other side. This is one of the stories we heard when we were living in Anaconda, Montana. We never were sure which stories were true, but then there was the incident reported in the paper just before we moved.

Two boys, twelve-years-old and fourteen, were hunting on the hill just behind town. The same hill my wife and I hiked on at times. They were separated, so one could scare up deer for the other to shoot. The twelve-year-old suddenly saw a mountain lion (also known as cougars) on the trail in front of him, coming at him. He shot into the ground in front of the animal, an it ran.

When his buddy came running over to see what had happened, the younger boy was still standing in the same place, unable to say much. Later, several adults went up the hill to look around. From the tracks, they could see that the cougar had been stalking the boys.

Avoiding Mountain Lion Attacks

Attacks are rare, but they do happen. Unlike with bear attacks, they are almost never meant to scare you away. When a mountain lion attacks you, it intends to kill and eat you. What should you do then? try the following.

- Don't run along trails if you suspect there are cougars around. Running triggers a predatory response in mountain lions. This may be why so many attacks are on joggers.

- Stay together if you are with a group. Cougars are less likely to attack when you are in a group.

- Don't look like a wounded animal. Specifically, be careful if you are hiking with a limp or other physical problem. Try to hike with others in that case.

Ultralight Backpacking Quick Tips

Raising your body heat. You can get by with less cold weather wear and sleeping gear if you have more body heat. One way to create more is to eat fats before going to sleep. Fats create heat when they are digested (this is why eating whale blubber helps Eskimos stay warm). Corn chips are oily enough to help if you can't stomach a half cup of olive oil before bedtime.

Clubmoss spores (genus lycopodium) can be used as a antiseptic dusting powder for wounds and skin problems. The spore heads often give off puffs of the yellow spores as you walk through them. Collected green, they will open and release their spores in a day or two if kept in a warm dry place. I have collected more than a pound this way, for just a few hours work.

When using a pack with a hip or waist belt, the weight should be primarily on your hips. Lean forward and you should feel the shoulder straps come off your shoulders. The shoulder straps should be tight enough to stabilize the load, but shouldn't actually carry much weight.

When Mountain Lions Attack

If you are confronted or attacked by a mountain lion, don't play dead, or you will be. Fight for your life! try the following:

- Don't run. back away slowly when confronted, while doing anything you can to intimidate the animal.

- Don't bend over or show the back of your neck. This may cause the cougar to pounce on you.

- If you have a weapon, use it. This can be rocks that you throw at the cougar, or a walking stick you threaten it with, or anything you can use.

- Stand tall, hold open your jacket, and otherwise make yourself appear larger and stronger.

- If the mountain lion is on you, fight. One young man survived by poking his thumb into a mountain lion's eye. The animal let go of the man's head immediately.

Basically, you want to convince mountain lions that you are not worth the trouble. This can start before they ever see you, and continue even after they attack. Many attacks have been survived because the mountain lion changed his or her mind. Be convincing!

Key Points

1. Mountain lions rarely attack humans.

2. When they do attack, they intend to kill you.

3. Avoid behaviors that encourage attacks.

4. Convince the animal that you are too much trouble, and the attack will often be broken off.

5. Fight for your life!

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Chapter Thirty

Other Dangerous Animals

What are the most dangerous animals in the wilderness? We tend to think of bears and mountain lions. However, there are several animals that are just as dangerous or even more dangerous. here are some to watch out for.

Moose

Moose are actually one of the most dangerous animals out there. They kill more people every year than grizzly bears and mountain lions together. Don't approach them if you see them, and detour around them carefully. If an irritated moose is approaching you and you have time, you can try climbing a tree. Otherwise get some trees between you and it, and keep moving farther away.

Deer

Deer attacks are rare, but I have seen a video of one. It was a pretty vicious attack. It was during rutting season, and I believe the man had doe urine on as an attractant. Probably if you just don't antagonize deer they will always leave you alone.

Rattle Snakes

These are actually more dangerous to your flesh than your life. Amputations of fingers or loss of flesh due to swelling around bites is common. Death - at least if you get help - is relatively rare. Watch where you step, especially when stepping over a log or otherwise putting your feet where the surrounding ground isn't clearly visible.

Ultralight Backpacking Quick Tips

You can cut the top off an old fleece hat and use it as a neck gaiter. Just be sure it isn't too tight. Keeping your neck covered is a great way to prevent too much heat loss.

Peat moss (genus sphagnum) was used as a surgical dressing during world war two, and had distinct advantages over cotton, including antiseptic and astringent qualities. It is soft, and absorbs a lot of moisture too. Keep this one in mind for emergencies.

Don't hang a wet sleeping bag by one end to dry it out. The insulation can shift and clump up. Lay it out to dry, or hang it horizontally across some bushes or branches.

Porcupines

I have never heard of a porcupine attacking a human, but they can be very dangerous to your dog. If you are hiking with your dog and see a porcupine, immediately restrain the dog. The quills really can work into the dogs insides and kill him.

Wolves And Coyotes

There may be one or two documented deaths due to these animals (it isn't entirely clear). I wouldn't worry about either, unless you see that a pack of wolves is circling you in a predatory way. In that case, get ready to climb a tree or fight. Don't turn your back to them.

More Dangerous Animals

I have been attacked by a house cat, and bit by turtles and large mouth bass. My brother was once bit by a muskrat. The last three of these attacks involved poking at the animal or otherwise antagonizing it when we were children. The point is that any animal can be dangerous if you corner it or try to catch it or otherwise bother it. Most animals will leave you alone if you leave them alone.

Animal Bites

Animal bites should be washed out very well. Water with iodine can help irrigate and disinfect the wound. Gaping wounds should be closed if possible, while puncture wounds are best left open. Watch for infection. Antibiotics may be necessary. These are guidelines, and you should not consider this one paragraph to be a comprehensive guide to treating animal bites.

Note: Some of the more dangerous animals are insects, which are covered in the next chapter.

Key Points

1. Moose are actually the most dangerous large mammal out there.

2. Any animal can be dangerous if cornered or antagonized.

3. Leave animals alone and they will usually leave you alone.

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Chapter Thirty- One

Insect Bites

Mosquitoes may be as dangerous than all the bears, cougars and moose out there. They certainly are more irritating. There are far more human deaths from insects than all other deaths caused by mammals. Insects and other bugs are clearly a danger to be reckoned with.

Bees and Wasps

These two actually kill many more people than all the mammal deaths put together. If you are allergic to bees or wasps, be sure to bring whatever the doctor recommends when you are backpacking. Be careful around hollow rotted logs and other potential nesting places too.

Mosquitoes

These used to be just an annoyance here in North America. Now they carry diseases like West Nile Fever. Use any good repellent with DEET in it to keep them away. Camp where there is a strong breeze if they are particularly bad. Light colored clothing seems to attract fewer mosquitoes than darker clothing.

The smell of dirty socks and feet is known to attract mosquitoes. Interestingly the smell of limburger cheese is also a mosquito magnet. A few years ago, a scientist discovered that the same bacteria that is used to culture limburger causes foot odor. Now you might not want to bring limburger cheese backpacking - or eat it at all.

Mosquito head nets are a good idea if you know you'll be in an area with many mosquitoes. At about an ounce, they don't add much weight to your backpack.

Spiders

The black widow is usually black with a red (often hourglass-shaped) mark on it's abdomen. A bite can cause cramping pains that eventually affect the whole body. Restlessness, vomiting, nausea, weakness, and painful breathing are also possible. Though extremely painful, healthy adults usually survive. There is an antivenom if you can get to a hospital.

The brown recluse spider is brown, with a black violin-shaped mark on its back. The bite isn't painful at first, but after an hour or two the area turns red. Then a bump forms that eventually bursts, and the flesh starts "rotting" around the bite. In the first 36 hours, there may also be a fever, pain in the joints, and a skin rash. There is an antivenom if you can get to a hospital.

Black Flies

These are some of the most irritating of insect bites, because they blackflies not only swarm over you, but crawl and wiggle to get under clothing and at your skin. A head net helps. Unfortunately DEET doesn't work as well to repel blackflies as it does for mosquitoes. You should also seal your cuffs and pant legs tightly.

Ultralight Backpacking Quick Tips

Old raincoat sleeves can be made into lightweight water-resistant stuff-sacks with a little sewing. Old nylon jacket sleeves will work too, and make lighter stuff sacks, though not water resistant.

Club moss spores (genus lycopodium) were once used as 'flash powder' by magicians. Drop a pinch over a flame and it create an instant and large flash for signaling rescuers. It is also just fun. The flower heads often give off little puffs of the yellow spores as you walk through them. Collected green, they will open and release their spores in a day or two if kept in a warm dry place. I have collected more than a pound this way, for just a few hours work.

Don't fold tarps and tents. Stuff them into their stuff sacks. Folding repeatedly in the same way creates weak spots in the fabric.

Scorpions

Fortunately, most scorpion stings are not all that dangerous for healthy adults. There will usually be localized pain and swelling, some numbness around the bite, and not much more. The more dangerous species (like the yellow Centuroides sculptuatus) are found in Mexico, New Mexico, Arizona and Southern California. these usually cause immediate severe pain. Get to a hospital!

Fire Ants

These inflict dangerous insect bites only if you are sensitive or get stung by many (at least dozens) at once. The bite is very painful. Watch where you step or sit down if you are in fire ant territory.

Ticks

Ticks in the east and midwest can carry Lyme Disease. In the west they carry Colorado Fever and Rocky Mountain Spotted Fever. They usually are a threat early in the summer, or later at higher elevations. Tick bites become rare by the end of August. Check yourself a couple times daily for ticks (with a friend's help, if possible). Slowly pull them loose if they have already bitten you.

Insect Bite Remedies

To relieve the itch from insect bites, including mosquito bites, you can apply the juice of jewelweed plants (Impatiens biflora). This plant grows in wet areas, and water dripped on the leaves beads up, looking like jewels, hence the name. The stems are translucent, and the plant has dangling yellow or orange flowers.

Ice (or snow) also helps if applied to painful or irritating insect bites. Ice isn't usually available when backpacking, of course, unless you are hiking in winter or high in the mountains. Cold water may provide some relief.

If you have Benadryl or another antihistamine, these can control the swelling caused by some insect bites. Aspirin or acetaminophen can also relieve some pain related to insect bites. Seek medical help for bites from particularly venomous bugs, those that cause shock or from insects you are allergic too.

Key Points

1. Use repellent with DEET to avoid contact with insects.

2. Use head nets and tight cuffs.

3. Application of ice or snow may help relieve pain and swelling caused by insect bites.

4. Seek medical help when necessary.

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Chapter Thirty-Two

Cleanliness

Cleanliness and personal hygiene are not big issues on a short backpacking trip. Other than a change of socks, why bring any extra clothing for an overnighter? Why even think about washing your hair if you will be camping for a weekend?

On longer trips, however, you will need to wash yourself at some point. On any trip, you'll probably want to brush your teeth. Here are some general tips for cleanliness and personal hygiene while on the trail.

Teeth

Cut your toothbrush handle short. This isn't even as much about weight as it is about fitting it more conveniently in your bathroom kit. For a short trip, you can brush without toothpaste. For longer trips, it may be better to bring a little baking soda in a plastic bag, and brush with that. If you forget your toothbrush, some tree twigs, like dogwood, can be chewed at the end, and the resulting "brush" used for your teeth.

Body

If you bring soap, make it biodegradable and use very little. Wash away from water sources. Rub water on yourself, lather up, and slowly rinse off by pouring water over yourself. Dome right, you can get a good shower from a liter of water. Washing without soap works well enough on short trips.

There are many who think we should essentially have no contact with nature except to walk through it. I don't buy that idea. Wash up in that lake or stream - just don't use shampoo or soap.

Towels? I never bring them. Shake off the water and stand in the sun for a moment. When the weather is fine you'll dry quickly from hiking in any case. I often use any clothing I have as a towel, and let it hang from the pack to dry.

A handkerchief can be used for simple "sponge baths." Get it wet and wipe yourself down, or at least wash out your underarms. The handkerchief should be rinsed out away from stream and lakes.

Hair

For a trip of a few days or less, wash your hair well before you leave, and leave it at that. People used to do just fine washing their hair once per week. On longer trips, rinse it out in a stream or lake once in a while. If you do use shampoo, use it away from water sources.

Clothing

Swimming in a lake with your shirt on will wash it out well enough, and it will dry quicker if you just leave it on while you hike (weather permitting). To wash socks, carry some water away from a stream or lake and wash the socks out by soaking, scrubbing, then rinsing them as you slowly pour water over them. Wring them out and hang them from your pack to dry while you hike.

Ultralight Backpacking Quick Tips

Planning to have campfires? It may be tough to start one if everything is damp. Carry a fire starter or two, to make it easy. Pieces of cardboard soaked in candle wax work well, even when wet.

Dried peat moss (genus sphagnum) can be used for insulation to turn a light jacket into a warm coat. Just stuff the jacket full without removing it. It can also be used as mattress material or toilet paper.

Sleeping bags should not be stored in stuff sacks. This constant compression will eventually crush the insulation, making for less loft and therefore less warmth. Store bags unpacked on a shelf or in a large cloth bag.

Washing Dishes

The "leave no trace" fanatics actually recommend straining out food particles from your dishes and packing them out. The wild carrots all over the wilderness are the same species as the ones I bring with me, so how can a few pieces hurt? They can't.

Go ahead and wash out your pan using water from a lake or stream. Just dump the wash water away from the stream at the base of a bush, or in a small hole scraped in the sand. The odd noodle or two may be ugly, and certainly can attract animals (keep that in mind), but otherwise there is no study showing that our dishwater is destroying the wilderness.

I don't use soap. The pan will be sanitized by cooking, and bowls and spoons, if scrubbed with sand and dried thoroughly, will be safe enough.

Pooping

In many crowded parks, you are asked to or required to carry your fecal waste back out with you. This may be a good idea in those areas. In most areas, it is enough to scoop a hole in the earth and bury it - at least 100 yards from water sources. At high (above tree line) altitude there are not the necessary microorganisms to break it down. The newest technique, therefore, is to smear it on a rock (out of sight please), where the sun can disinfect and dry it to break it down.

Use as little toilet paper as you can. In some areas it is appropriate to bury it along with your poop, while in others it may make more sense to pack it out, or at least burn it before you bury it. Not all environments are equally fragile, and you'll have to think for yourself on some of these issues.

Urine usually isn't a problem, being generally inert. In some crowded areas, like the Grand Canyon, they advise peeing straight into the river. The volume of water there makes this appropriate. Otherwise, the few good places to camp start to smell of urine from the thousands of visitors.

A Few More Cleanliness And Hygiene Tips

- Anti-bacterial hand sanitizer, in one-ounce plastic bottles, is a convenient way to clean your hands on the trail. Regular rubbing alcohol does the same thing and costs less.

- Crushed spruce needles can be rubbed under your arms to mask odors.

- Washing socks with crushed pine or spruce needles can help make them smell better.

- Water bottles are more sanitary than bladders, because there are no outside exposed mouthpieces that can get dirty.

- Add three times as many iodine tablets as normal to water, and you have a decent disinfecting wash for cuts or skin problems, or to wash foods that may have bacteria on the surface.

- Hanging clothes in the sunshine and air will partly disinfect them and make them smell fresher.

Key Points

1. Cleanliness and personal hygiene are more important on longer trips.

2. There are simple ways to stay clean on the trail.

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Chapter Thirty-Three

Wilderness First Aid

This chapter is a short introduction to the topic of wilderness first aid. It is an area you will have to learn more about elsewhere, if you want to be entirely prepared. It is not an area I am knowledgeable about. Fortunately, I have managed to avoid serious injuries and illnesses for the decades I have been backpacking.

There are good books on the subject if you choose to learn more. At a minimum, I suggest carrying a a small first aid pamphlet. They come in some first aid kits, and show general procedures for treating injuries and shock.

This is what you ideally should know to be truly prepared for a long wilderness trip:

- How to prevent, recognize and treat shock

- How to prevent, recognize and treat hypothermia.

- How to prevent, recognize and treat frostbite.

- How to prevent, recognize and treat burns.

- How to prevent, recognize and treat hyperthermia (heat stroke and heat exhaustion).

- How to prevent, recognize and treat blisters.

- How to prevent, recognize and treat animal bites.

- How to prevent, recognize and treat high altitude sickness.

- How to prevent, recognize and treat plant dermatitis (poison ivy, poison oak, etc.)

- How to prevent, recognize and treat snake bites.

- When to seek outside help.

- How to splint a broken bone.

- How to stop bleeding.

Ideally, someone in your group should also know how to do CPR. You should also carry appropriate

medical supplies. For an idea of what to have in your wilderness first aid kit, see chapter eighteen.

Ultralight Backpacking Quick Tips

Knowledge saves weight. For example, you can leave the rainwear home (except for a 2-ounce emergency poncho) if you are in the eastern Sierra Nevadas in September. You can just about leave the sleeping bag behind on summer trips in some parts.

Socks, especially if they are thicker, make good water bottle insulators when you want to keep your water cold or hot. This is assuming you use regular plastic soda bottles for water, as I do.

A grizzly bear in Yellowstone once taught me that you shouldn't pitch camp along animal trails. You should also avoid setting up camp at obvious animal watering holes.

How Much Do You Need To Know?

Read any good book on wilderness first aid, and you may feel like the author thinks only doctors should be backpacking. You will also notice that the author's idea of a first iad kit is something that prepares you for surgery and weighs three pounds - for the light version. This is to be expected. A fisherman would have you carrying five pounds of fishing gear on any backpacking trip too.

Where is the balance between your precious time and how much you should learn about first aid? Where is the balance between keeping your pack light and bringing the proper medical supplies? It is in your head. Neither I nor anyone else can make these decisions for you.

Can you die because you didn't bring enough supplies? Yes. Does that mean I am carrying the necessary items to stitch myself up, and tourniquets and antibiotics? No, none of the above. Should you carry these things? I don't know.

My intent in the chapters on wilderness dangers is just to give you *some* information to help you make those decisions. In backpacking, as in the rest of life, you have to decide what risks to take, and what steps to take to reduce your risks.

Okay, I am getting repetitive. One more thing I do want you to know, is that what I have covered in the chapters on hypothermia, frostbite, insect bites, and this chapter, is very limited. I haven't even touched on the following:

- Treatment for shock.

- Influenza and other viral illnesses.

- Eye infections.

- Snow blindness.

- Head injuries.

- Heat stroke and heat exhaustion.

- Nose bleeds.

- Earaches, ear infections, and other ear problems.

- Sore throats.

- Dental problems.

- Burns.

- CPR.

- Heart attacks.

- Twisted ankles.

- Broken bones.

- Diarrhea.

- Constipation.

- Bladder infections.

- Hernias.

- Lacerations.

- Puncture wounds.

- Skin rashes.

- Splinter removal.

- Ingrown toenails.

- Fungal infections.

- Poisoning.

- Dislocations.

- Snake bites.

- Fevers.

- Rabies.

This isn't a list to scare you. Most of these medical problems can also occur when you are "safe" at home. You may want to look over the list though, and decide which problems are most likely to affect you when backpacking. That way you can go online or in a good book and get the wilderness first aid knowledge that will most likely help you.

Key Points

1. You should know a few basics about wilderness first aid.

2. You decide how to balance risks versus time to learn medical treatments, and weight of medical kits.

3. Consider which problems are most likely to affect you when studying wilderness medicine.

4. This is not a wilderness first aid guide.

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Chapter Thirty-Four

Winter Weather

Winter weather brings its own challenges to backpacking. It is certainly more difficult to keep your pack weight down in the winter. You need more clothing, more food, heavier tents and sleeping bags, and a stove that you might not bring in the summer. It is also inherently riskier to backpack in the winter. The cold is constantly threatening you with frostbite or hypothermia.

Of course, you still want to keep it as light as you can when hiking or backpacking in the winter months. It is enough extra effort to be walking through snow or lifting those snowshoes. You don't want a fifty-pound backpack slowing you down as well.

You want to keep yourself safe too. You can't risk going without proper gear, like you sometimes can in better weather. How then, do you ultralight backpack safely during winter weather? Here are some ideas.

Winter Weather - Backpacking Gear

Heavier isn't always warmer. My 17-ounce sleeping bag really does keep me warmer than my 3-pound one did. Look for the most warmth for the weight. This will usually be found in down filled sleeping bags and parkas. Nylon pants over lightweight poly-pile underwear will be lighter, warmer and safer than jeans.

I have actually camped using a tarp in the winter, but generally a tent is a better idea. The air inside can be ten degrees warmer than the outside temperature. Frost on the walls inside is common, so you will want the tent to be large enough that you won't be rubbing against the sides. Floor-less tents that use your trekking poles for supports and a ground cloth, can work as well, especially since you won't have bug problems. They are often lighter than the alternatives.

You generally need a stove in the winter. Even if you don't want to cook many meals, you will need to melt snow or ice for drinking water. An alcohol stove is the lightest option. It won't work well for cooking, but it may be sufficient for melting snow, if that is all you'll be using it for. White gas stoves are better for cooking in cold weather.

Dressing in layers is the rule for winter weather. This isn't actually about more warmth for the weight, because the extra layers of shell material (the nylon covering your jacket) don't provide much extra warmth (you only need one wind-blocking layer). The more important point to layering your clothes is that you can regulate your body heat, removing layers as you get warm - before you sweat and risk getting cold from the wetness later.

Winter Weather - Food

Your winter diet should be different than your summer diet when backpacking. Soup and tea can help keep you warm, for example. You also need more calories in the winter, because you burn a lot just to heat your body. If you want to keep it light, this means bringing more fatty foods, because fat provides more calories for the weight.

There is another reason to have fatty foods. Fat produces heat when you digest it. This means that in addition to providing more calories, it also is reducing your need for calories. Eskimos get real benefits from eating that whale blubber.

I like corn chips myself. They are tasty and fatty. You can also add more fat to your diet by bringing olive oil in a plastic bottle. Add a little to each batch of soup. Butter and cheese are decent winter backpacking foods too.

Ultralight Backpacking Quick Tips

You can use the plastic bladders from boxed wine to carry water, and as a pillow. Normally I use a plastic soda bottles to carry water when backpacking, but when I have needed to carry more water I've used the plastic bladders from boxed wine. They are light and very strong. I also inflate the bag with air to use it as a pillow. It just needs a soft covering of some sort, like a sweater or shirt.

Buy paperback novels at thrift stores and rummage sales for reading on the trail. You can burn the pages in the campfire as you finish them, thus reducing your weight as you go.

Hike early. Start getting ready before it is even totally light. An early start means an early finish - no setting up camp in the dark. It also means hiking when it is cooler. It is a safer and more enjoyable routine.

Winter Weather - Knowledge And Skills

What you know can make backpacking in winter safer and lighter. You will be safer if you know how to deal with all the various problems and potential emergency situations that come with winter hiking. You can go lighter, because you don't need to overcompensate with gear for your lack of knowledge.

What kind of knowledge? Here is a list:

- How to start a fire in any conditions.

- Where to pitch your tent.

- How to use your sleeping bag and clothing for maximum warmth.

- How to eat and drink to stay warmer.

- How to regulate your body heat for maximum warmth.

- What weather can be expected.

- Other tricks for staying warm.

Fire starting will be covered in its own chapter. "Tricks" for staying warm are scattered throughout the book, mostly in the *Ultralight Backpacking Quick Tips.* The following are some other techniques and routines for winter weather backpacking.

- Your sleeping bag should be "fluffed up" as much as possible to provide the maximum of dead-air space (this is what insulates you). Don't wait until you are ready to sleep to unpack the bag. Lay it out as soon as the tent is up, so it can expand fully. Use your hands to fluff it up even more.

- Sleep in your clothes. Some say otherwise, but this has always been the warmer way for me - and have tried it both ways.

- Breathing into your sleeping bag will keep you warmer. However, only do this if it is the last night of the trip or if you will have an opportunity to dry the bag out in the sun the following day. Otherwise, the condensation from your breath will make the bag a little damper each night, flattening the insulation and so making you colder.

- In the morning shake out your clothing before putting it on. This will fluff it up and allow it to insulate you better.

- If you have a short sleeping bag pad, put your empty backpack under the foot of your sleeping bag at night to insulate your feet from the ground.

- Eat snack foods while you are hiking and warm. Reserve hot meals and drinks for morning and just before sleep, to help you stay warmer during these colder times.

- If you water bottle can handle boiling liquids, fill it with hot water or tea in the evening. You can keep it with you in the sleeping bag for warmth (close it tightly). You can also have a drink if you get cold or thirsty in the night.

- Dehydration can cause you to be colder. You need enough fluids for your system to send warm blood to every tiny capillary. Be sure you are drinking enough.

- Check on the weather forecast before you leave for a backpacking trip. People have been trapped in

in the wilderness because the snow became too deep to walk through. Bring a cell phone, extra food, and extra stove fuel if heavy snow is a possibility.

- Wet weather near freezing can actually be worse than colder temperatures. This is because getting wet will more likely make you cold. Make sure you have what you need to stay dry.

- Don't sweat. Try to remove clothing before you get sweaty. If your clothes get wet from your perspiration, you are likely to get colder later when you are sitting still.

- Go to sleep warm. It is tough to get warm if you are already really chilled when you climb into the sleeping bag. Do a few push-ups or drink some hot tea. As soon as you feel warm (but not sweaty), get into that sleeping bag.

- Wear a hat when you sleep. A hat is probably equal to another pound of insulation in your sleeping bag. A lot of heat is lost through your head when it isn't covered.

- Conserve energy. It's difficult for your body to warm itself if you have used up your energy reserves. You also don't want to be too tired to do what you need to protect yourself, such as gathering firewood or hiking out to the car to escape the blizzard. You'll also make better decisions if you aren't tired - and better decisions mean safer wilderness travel during winter weather conditions.

Note: I can usually still keep the pack weight to about 20 pounds for a weekend winter trip, and don't take too many chances.

Key Points

1. Winter brings one constant danger to hikers - cold weather.

2. You can still keep it light and safe when you backpack in winter.

3. Three things you need: good gear, good food, and good knowledge.

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Chapter Thirty-Five

Hiking In A Desert Climate

A desert climate isn't always a hot one. It is dryness that best defines a desert. Heat is certainly an issue for backpackers, but getting enough fluids is the larger problem.

When my wife and I moved to Arizona from Michigan, we were amazed how our skin was dry and comfortable when it was 105 degrees (41 Celsius) outside. We also noticed that people were commonly carrying water bottles as they took the bus to work or to go shopping. Soon we were drinking much more than we used to. We needed to.

Your first time in the desert, you may be surprised how much water you need. Surprised, because

you don't really feel like you are sweating that much. This is because, in the dry desert air, your perspiration can evaporate as fast as it comes out of your pores. It is very comfortable compared to the "sticky" heat of more humid areas.

Of course, this also means it is easy to become dehydrated very quickly without realizing it is happening. Anytime you are hiking in the desert, carry much more water than you think you'll need. If you are on a multi-day trip, be sure you know where you'll be refilling your water bottles, and that they hold enough to get you there.

Surviving In A Desert Climate

From the Army Survival Guide: "The body requires a certain amount of water for a certain level of activity at a certain temperature. For example, a person performing hard work in the sun at 43 degrees C requires 19 liters of water daily. Lack of the required amount of water causes a rapid decline in an individual’s ability to make decisions and to perform tasks efficiently."

In other words, unless you have unlimited water to drink, in a hot climate you should limit your activities during the hottest time of the day. Get those miles in early, perhaps starting your hiking just before sunrise. Hiking in the evening is the second best time. With a full moon, you might even try hiking from four in the morning until the heat builds up.

Even with unlimited water, be careful. Your body cools itself by sweating, but it can only process so much water per hour. You *can* reach a point where you are perspiring faster than you can process the incoming fluids. A belly full of water won't help if it is being absorbed slower than it is used. If, as a result, you stop sweating during hot weather and high activity, you'll quickly develop heat stroke, which requires immediate medical attention.

Ultralight Backpacking Quick Tips

Starting a fire without matches or a lighter is tough. Just for kicks, try any of the primitive fire starting methods you have read about sometime. I think it will convince you to bring matches and another starter on every wilderness trip. It is also a good idea to carry dry tinder in your pocket, so you are ready to start a fire even if it rains.

Be careful about using rocks from a wet area for building a fire-ring. I have had rocks explode from heating, and it can be very dangerous. Water trapped inside can't escape fast enough, causing the rock to explode, and throw sharp pieces at you.

Sunglasses are a good idea on most backpacking trips, but especially so if you will be hiking in the winter or at high altitude. Why? High altitude sun is more damaging to your eyes, and snowblindness is a risk if you are hiking in a snowy environment.

Symptoms Of Dehydration

The first symptoms of dehydration are thirst, dry mouth and dark yellow urine. Headache is common too. Dizziness and mental confusion are possible as the dehydration worsens.

Dehydration leads to serious conditions, as does general overheating, with or without dehydration.

Here are the three primary heat-related medical conditions you should watch for when backpacking in a hot desert climate:

Heat Cramps

Heat cramps are caused by a the loss of salt due to excessive sweating. Symptoms include muscle cramps in legs, arms, or abdomen. They may start as a mild discomfort. At that point you should stop all activity, get out of the sun, and drink water. Continue your physical activity, and you will have severe muscle cramps and pain. In that case, treat as for heat exhaustion, below.

Heat Exhaustion

Heat exhaustion is caused by a large loss of body water and salt. Symptoms include headache, mental confusion, irritability, excessive sweating, weakness, dizziness, cramps, and pale, moist, cold (clammy) skin. Get the victim out of the sun! Ideally he should lie on something about 45 centimeters off the ground (it is much cooler there). Loosen his clothing, sprinkle him with water and fan him. He should drink small amounts of water every 3 minutes, and stay quiet and still.

Heat Stroke

Heat stroke is a severe heat injury caused by extreme loss of water and salt and the body's inability to cool itself. The victim may die if not cooled down immediately. Symptoms include lack of sweat, hot and dry skin, headache, dizziness, fast pulse, nausea and vomiting, and mental confusion eventually leading to unconsciousness. Get the person in the shade! Ideally he should lie on something about 45 centimeters off the ground (it is much cooler there). Loosen his clothing, sprinkle him with water (or pour it over him) and fan him. Massage the arms, legs, and body. When consciousness, let him drink small amounts of water every 3 minutes.

Other Desert Dangers

- Watch for snakes scorpions and fire ants (see the chapter on dangerous animals).

- Be careful when hiking in dry canyons. Rain further upstream can send a wall of water your way. Scope out possible escape routes as you hike.

- Be careful of the cactus. Some prickly pear cactus have tiny hair-like spines that can take hours to remove after simply brushing your arm over the plant.

- Sit up off the ground when it is hot. Desert sand and rock averages 30 to 40 degrees (16 to 22 Celsius) more than that of the air. For instance, when the air temperature is 110 degrees (43 Celsius), the ground temperature may be 140 degrees (60 Celsius).

- Hypothermia can be a problem in the desert too. Dry desert air cools dramatically at night. Sometimes backpackers don't realize how cold it will be. Combine a lack of preparation with any rain, and you can get dangerously cold. Hike at night (if you can do so safely) to warm up. The sun will usually warm you quickly in the morning.

- Use sunblock, and keep your body mostly covered to prevent serious sunburn. A hat and sunglasses are good ideas too.

Key Points

1. Be prepared for backpacking in a desert climate.

2. Watch for symptoms of dehydration.

3. Treat potential heat-related conditions early, before they become life-threatening.

4. Be aware of other desert hazards, such as flash floods, snakes and cold nights.

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Chapter Thirty-Six

How To Use A Compass

You need to know how to use a compass if you spend much time in the wilderness. There are many unprepared backpackers out there who are carrying compasses with them, thinking these devices somehow will point their way out of trouble, if they get lost. They won't if you don't know how to use them. What good does it do to know which way is North if you don't know whether you are directly south of your car or whatever you want to reach?

Do you know how to use a compass? If you are not sure, get out and try it. Take a map of any wooded or wild place near home, go there, and navigate your way to some point using a compass.

Think your GPS will save the day? You may be right. A GPS can be used to guide you right back to your car or wherever you set it for. Of course, you still need to learn how to use this as well. A GPS also has the problem of batteries that can die on you. I would always carry a small compass as a back-up if I was bringing a GPS (and I don't bring mine backpacking due to weight).

How To Use A Compass - Some Tips

Complete instruction on how to use a compass is too much for a small chapter in this book. If you need to learn from scratch, go to the bookstore or library and get a good book on the subject. If, however, you already know a little, here are some tips to help you out.

Bring A Map

Even a highway map with little detail is better than nothing. It has highways and roads you can aim for if you get lost. It may even show a mountain or two, so you can identify a landmark and figure out where you are.

Head Off-Target

Often when people are lost, they still know where they are in relation to a road or trail. For example,

you may know that the logging road your car is parked on is to your south. Use your compass to head south and you will find the road. However, now how do you know which way to go to reach your car? Did you come out to the East or West of it?

The trick here, is to head to the west or east of where you want to end up. This way, when you reach the trail or road you'll know which way to go to reach your car, camp, or whatever point you are aiming for. Obviously this means going farther than if you head straight to your target, but going straight to anything is almost impossible with a compass in the wilderness. This keeps you from wasting even more time guessing which way to go.

How To Go Straight

My brother and I were walking up to a hidden lake to go fishing. The woods were hilly, but with no obvious landmarks. We knew that if we kept the sun behind us, we would be heading for the lake, so I didn't take out the compass. The sun went in and out of the clouds. We skirted a few wet areas and hills, corrected course afterwards, and thought we were going in the right direction.

Then we looked up at some point. "Isn't that the sun in front of us?" my brother asked. It was. "And weren't we supposed to have the sun at our backs?" We had almost walked back to the car. I took out the map and compass and used it. We were at the lake in fifteen minutes.

You may know exactly which direction you want to go, but even with a compass it isn't easy to go straight through a wilderness area. There may be swamps, cliffs, and thorn bushes to go around. How do you stay on that straight heading?

First use your compass to locate a tree, hill or other object far away in the direction you want to go. Generally, the farther the better (easier here in the West than in the thick flat forests of the East). Now pick the easiest route there. Once there, pick another destination in the same way, until you get to where you are going - without swampy feet and ripped skin.

Ultralight Backpacking Quick Tips

I've seen a poison ivy rash clear up overnight by using the juice from jewelweed. (Impatiens biflora). This plant grows in wet areas, and water dripped on the leaves beads up, looking like jewels, hence the name. The stems are translucent, and the plant has dangling yellow or orange flowers.

Planning to have a fire at the end of the day? As you hike, collect some dead pine needles, dried moss, etc. This way you'll be ready to start a fire when you stop for the night, even if it is a bit wet by then.

Does the color of your clothing matter? Light colors attract fewer biting insects. Flashy bright colors have been shown to attract grizzly bears. On the other hand, having something bright and easily visible to rescuers from the air could save your life if you are lost.

What You Need To Know To Use A Compass

Here are a few of the things you should learn:

- What the "declination" is for the area you are in. True north will be to the right or left of where the needle points, depending on where you are. You need to know how many degrees, and in which direction to adjust your compass.

- How to read a map. A compass won't normally do anything for you without a map. In any but the flattest areas, you should also know how to read a topo map. Those contour lines will tell you whether you are heading towards a gentle slope or a cliff - if you know how to read them.

- How to use a compass with a map.

- How to take a heading using a compass.

- How to "triangulate" your position using two landmarks, a map, and a compass.

Learn and practice the above compass skills before getting too far into the wilderness.

How To Get Free Topo Maps

Type "free topo" maps into a search engine, and you should find a few places to get maps. Of course you have to have a printer to print them out. Also, some of the web sites are really just offering a free trial for a paid subscription.

Another way to get almost free topo maps is to visit your local library. They probably carry map books, including the county map books for the state you are in. These usually have contour lines and a scale that makes them usable for backpacking trips. They usually show the magnetic declination for the area as well. I can photocopy a large page in one for 20 cents at my library - a lot cheaper than the $10 The forest service wants for a map of the same area.

If you do a lot of backpacking in a state, you can buy these map books at many stores. They may be called a "county map book," "atlas," or "gazetteer." They run about $20 or less, and often have 70 or more maps covering the state. Just cut out the page you need when you go backpacking.

Key Points

1. A compass won't help if you don't know how to use it.

2. You should learn how to use a compass and topo map together.

3. This chapter has tips, but is not a guide to using a compass.

4. Free topo maps are available online and in libraries.

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Chapter Thirty-Seven

How To Start A Fire

Knowing how to start a fire can make the difference between living and dying. The primary benefit of a fire to a backpacker is as a way to stay warm in an emergency situation. You can also cook over a fire, protect yourself from animals with it, and use it to signal rescuers, among the many other uses.

The three basics of a fire are fuel, air and heat. You need all three to start a fire and you need to keep them in proper ratios to keep it burning well. This is something you learn primarily by experience. For example, if you put logs or sticks too close together, air can't get in, so they won't burn well. Too far apart and they won't provide the heat to each other to burn well either. You have to practice to really have a "feel" for fire making.

There are also three basic materials you need. They are: tinder, kindling, and fuel. For examples, think paper, sticks and logs, but don't limit your thinking to these.

The Basics Of How To Start A Fire

Site Selection

Find a dry spot out of the wind, and close to your shelter. If you are using it for overnight warmth, be sure the heat will be directed towards where you will lay. Try to build it on sandy or rocky ground. Soft forest floors have too much flammable material nearby. They also have roots near the surface that can catch fire. The fire may then burn underground, and reappear later, starting a forest fire.

Contain the fire in a circle of rocks, but don't use rocks that are usually wet (like from stream sides). These contain water that may cause the rock to explode when heated enough. This is not a backwoods myth - I have seen it happen. Rake any flammable materials away from the fire.

Tinder

Tinder is dry material that ignites with little heat, and is especially important if you are starting a fire from a spark. This is the first thing to light, and is used to ignite the kindling. Some tinders that light with a match or other flame, include paper, birch bark, straw, pine sap, wax paper, dead dry leaves, cardboard, plastic, and dry materials soaked in vegetable or motor oil.

If you have no way to make a flame, you'll be starting your tinder with a spark or small ember. In this case you need a tinder that can hold a spark that can be blown into a flame. These include lint from your pocket, cattail seed head down, fine dry grass, cotton twine, cotton cloth, dry-rotted wood, and some dry funguses that grow on trees.

Kindling

Kindling is what you add to the burning tinder. It should be dry to ensure rapid burning. It increases the fire’s temperature so that it will ignite less combustible material, like logs. Kindling can include small pieces of driftwood, sticks, split-up logs, sappy pieces of pine bark, and thicker pieces of birch bark.

Fuel

This is what you build up to. You can't light a log with a match, and you'll be running around all night if you have only kindling for your fire. The fuel can include logs, larger tree branches, broken-off pieces of tree stumps, driftwood, old lumber, and anything else that burns. I have even used dry buffalo dung.

Not all woods are equal. Maple will produce twice as much heat as pine. However, pine will be easier to cut or otherwise collect. Alder has dead, easy-to-break trunks that burn well without much smoke or sparks, making it good for a cook fire. A smokier fire may be wanted, though, if rescuers are looking for you. With practice you will learn which woods work best for various purposes.

Ultralight Backpacking Quick Tips

Winter camping? You actually can make snow-block shelters without tools when the conditions are right. I have made trench-shelters of 2 x 3 foot snow-blocks with no tools. I stomped rectangles in the heavily-crusted snow and lifted up the resulting blocks. Stacking them on either side of a trench in the snow, and then across the top for a roof, I was able to make a shelter in twenty minutes.

Diarrhea? I once used the twigs from an oak tree to stop diarrhea when I was backpacking in Mexico. Just make tea with a spoonful of the bark or chopped-up twigs. I have since learned that the tannins in oak can be hard on the kidneys, so drink just one cup of tea, and use oak only if you don't have other options.

If you carry one of those multi-tools that has pliers, take the handles off your pots. The pliers will work fine for handling the pots, and you'll save weight and space.

How To Lay A Fire

There are teepee fires, pyramid fires, lean-to fires and just piles of wood that burn. Experiment a little and practice various types before you lose your backpack in a river, or have your down sleeping bag soaked by rain. There is more on specific types of fires in the Wilderness Survival Guide at The Ultralight Backpacking Site .com, but practice is worth much more than study in this case.

Essentially you want a nest in the middle of your kindling, where you will ignite your tinder, or place the tinder once ignited. The kindling should have enough air space between the pieces, but not be too far apart. More kindling and fuel should be ready, so you can quickly add it as necessary.

Lighting The Fire

One match or flame should be all that is needed to start the initial fire. Start the fire on the side the wind is blowing from. Protect the flame from the wind with your body and hand. Blow gently on the flames once they are strong, to help them spread to all the kindling. have more tinder and kindling ready, in case the fire threatens to die out. Feed small twigs and other kindling into the fire until it is large enough to take logs or other fuel.

Starting a fire with anything other than a match or lighter is very difficult, by the way. There are many survival techniques for creating a spark, and capturing that spark in tinder, and blowing it into a flame. You may have heard of the "fire plow," bow and drill," and "rock and metal" methods. Try one sometime. Doing so will convince you to always carry matches *and* a lighter. (If you really do

want to learn how to start a fire using primitive techniques, it is a great survival skill to have.)

How To Start A Fire - A Few More Tips

- Collect twice as much firewood as you think you'll need for the night.

- Blow vigorously on the hot coals to restart the flames of a dying fire (and add fuel).

- Spray kindling with insect repellent or other flammable liquids to make it burn more easily.

- Use a large piece of birch bark to shelter a fire if starting it in the rain.

- Wood on the ground is usually wet. Look for standing dead wood or trees and branches that are leaning against other trees or rocks.

- You can break a long piece of wood by inserting the end between two close trees and pushing on the far end. Be careful not to fall when the wood breaks.

- Don't break wood over your knee or by jumping on it. Lean it up on a rock and step on the middle of the piece.

- Unbreakable pieces can be burnt in half in the fire.

- Use a base of green logs or sticks for a fire on the snow.

- If firewood is scarce, use as small a fire as possible, to extend your fuel supply.

- Collect and carry dry tinder in your pocket, in case it is raining when you need to start a fire.

Key Points

1. The best way to learn how to start a fire is to practice.

2. A fire requires tinder, kindling and fuel.

3. A balance of air, heat and fuel is necessary for a fire to burn well.

4. Fire starting without matches or a lighter is very difficult - bring a lighter *and* matches.

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Chapter Thirty-Eight

Hiking Trip - Planning

Hiking trip planning consists of choosing a destination, learning about the destination, making a

packing list, setting the dates, getting the gear and supplies together, and watching the weather reports. Of course, you should already be in decent physical shape before you go. If not, make that art of your plan. Here are some other things to consider in your planning:

How many miles a day can you comfortably hike?

If you aren't sure, get out there and take a preparatory hike. Consider the terrain you'll be hiking in too. If you are planning on covering twenty miles in two days, and it turns out that you can only do five miles per day, you might run out of food (and lose your job).

Does your planning allow for delays due to bad weather or blisters?

At least allow for a couple unexpected events. In the Sierra Nevadas, I once tried to take a short-cut through what turned out to be a dead-end canyon with unclimbable (for me) walls. That unexpected little adventure cost me half a day, which, fortunately, I had allowed for.

Did you research the area you will be hiking in?

This is getting so easy to do now with the internet. The national park service has all sorts of information on line. Somebody has a trip report or two for almost anyplace you could go. Type your destination into a search engine, and see how many streams you'll be crossing, whether there will be ice or snow on the trail at that time of year, and more. This way, you can bring what you'll need.

Ultralight Backpacking Quick Tips

You have heard about the "windchill effect," right. Well, windchill is an effect that only takes place when you are in the wind, so get out of it if you are cold. Also, the standard charts measure the effect of wind on exposed skin. If you are properly dressed, the evaporative effect isn't there, so the apparent temperature isn't reduced as much as the charts indicate. Tighten up the openings in your clothing!

Tea of witch hazel leaves (Hamamelis virginiana) can be used for relief from insect bites and sunburn. Witch Hazel once was a common astringent that women used as a "tightening" and refreshing face wash.

If backpacking with others, a frisbee can be a fun addition to the trip. It also doubles as a plate, or to pan for gold, or as a shallow wash basin for doing dishes.

Are you compatible with your partners?

If you like to hike the first ten miles of the day straight through, and your buddy wants to stop to explore cliffs and swim in lakes, you will not get along. Maybe you think hiking six miles is a long day, but others in your group like to cover twenty miles daily. Be sure you are going with the right people for this destination and the type of camping or hiking trip you are planning.

Do you know what you need for food?

You will probably eat more than normal because of the exertion of hiking every day. Do you know how many calories you normally eat? Also consider whether you'll have enough food that doesn't

need cooking, or you'll spend more time than you planned fiddling with your stove.

Do you have enough fuel for your stove?

If you aren't sure, try cooking a typical meal that you will have on the trail. Do it outside in the wind. See how much fuel you use. Multiply this by the number of meals you are planning for the trip. Bring extra - just to be safe (I know from experience that Ramen noodles are awful when uncooked).

Do you have the means to purify enough water?

Your water filter will just be extra weight if it is clogged or reaches its safe limit the first day out. See if the filter element needs replacing. You may want to bring iodine tablets as a back-up as well.

Do you know what the weather will be like?

You can use the internet for this as well. There are free weather reports all over. If you know it will be windy and rainy, you might reconsider your plan to bring a small tarp for a shelter. If the weather is unpredictable where you'll be hiking, just try planning for the worst.

Key Points

1. Choose a destination - and the research it.

2. Be physically ready.

3. Planning a hiking trip has to include choosing the right partners for the type of trip and destination.

4. Plan for enough food water, clothing and other essentials.

5. Watch the weather forecast before you leave.

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Chapter Thirty-Nine

Backpacking Trip List

My basic backpacking trip list is where I start. I don't bring everything on the list, because every trip is different. The point is to have a checklist with everything I might possibly bring on some backpacking trip. From this I choose what is needed or wanted for this particular trip, with no danger of forgetting anything important. Below is such a list.

The Master Backpacking Trip List

(Not always in logical order.)

___Backpack

___Backpack rain cover

___Tent

___Tarp

___Groundsheet

___Bivy sack

___Umbrella

___Sleeping bag

___Sleeping bag liner

___Sleeping bag pad

___Pillow

___Trekking poles

___Water bladder

___Water bottles

___Water

___Water purification tablets

___Water filter

___Food

___Stove

___Stove fuel

___Cup

___Pans

___Fork

___Spoon

___Plate

___Can opener

___Matches

___Lighter

___Knife

___Other tools

___Compass

___GPS unit

___Maps

___Pen

___Pencil

___Paper

___Book

___First aid kit

___Survival kit

___Waterproof matches

___Lighter

___Fire starters

___Soap

___Shampoo

___Hand sanitizer

___Toothbrush

___Toothpaste

___Towel

___Tweezers

___Light

___Headlamp

___Fishing gear

___Toilet paper

___Playing cards

___Socks

___Underwear

___Thermal underwear

___T-shirts

___Shirts

___Sweater

___Jacket

___Winter parka

___Winter pants

___Hiking pants

___Shorts

___Gloves

___Mittens

___Warm hat

___Sun hat

___Sunglasses

___Down vest

___Gaiters

___Hiking shoes

___Hiking boots

___Sleeping socks

___Handkerchief

___Rain coat

___Rain pants

___Rain parka

___Garbage bag

___Watch

___Knee brace

___Ace bandage

___Aspirin

___Camera

___Film

___Cell phone

___Bear spray

___Sunblock

___Insect repellent

___Mosquito head net

___Duct tape

___Ice axe

___Lip balm

___Twine

___Money

___Permits

___Plastic bags

___Dirty laundry bag

___Whistle

___

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Ultralight Backpacking Quick Tips

I love to explore old ghost towns when hiking here in Colorado, but I try to be careful. Abandoned buildings in the western United States may contain the deadly hanta virus. It is often found in rodent droppings, which dry and can become part of the dust. Avoid breathing the dust in old buildings, or sleeping on the floor.

Many plants can be used as an antiseptic dressing for cuts, if you have nothing better. One such plant is St. Johnswort. I once applied a few mashed up leaves to a nasty gash on my foot, replacing it occasionally, and I was amazed as it healed in a couple days with no scar. It is known to be anti-bacterial, anti-viral, and anti-fungal.

You can waterproof your own matches by either dipping them in shellac, nail polish or melted wax. You may have to scrape some of the coating away to get them to light easily.

If you know your computer well, you can select and print the above list.

Better yet, make your own "Master Backpacking Trip List." Include any backpacking item you can think of, and anything that has been on any wilderness trip you have taken. You may never bring even half of the items on your list, but if everything is there - and you really use the list - you won't forget anything you need on your next trip.

You may want to have a separate list for your first aid and survival kit. These should be checked and kept filled (are the water tabs past expiration?) before each long trip.

Key Points

1. Make a ***master backpacking trip list*** of everything you might bring on any trip.

2. Run through the list before every trip, to create the specific packing list for *that* trip.

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Chapter Forty

How Many Feet Are In A Mile?

How many feet are in a mile? Why should you know just to go backpacking? Maybe you don't really need to know, but this is actually knowledge that can be helpful, if you are a quirky backpacker like myself. I use math all the time in the wilderness, both to help me know where I am, and to plan the route and the day. These are useful things, right?

There are 5,280 feet in a mile, by the way. Oh, and I am not going to convert all the measurements in this chapter to meters and kilometers. It is the principle that matters, not the particular scale.

What is the principle? It is that you can navigate the trails better and plan the day better if you use a little math. If you know how many feet are in a mile, how long your stride is, and you have a watch, you can apply a little math, and put this knowledge to use. Let me start with an example.

I was recently hiking up one of the mountains around here. I didn't have a map with me, but I knew that I had to watch for a small trail that went up to the summit ridge. It was three and a half miles up the trail I was on, but easy to miss according to the directions I had. There were other small trails once in a while to confuse things more. I needed to know when I had hiked two miles.

First, using my watch, I counted how many steps I took in a minute. I did this a couple times and averaged out the result: 97 steps per minute. I knew from previous experience that my average stride on this rough terrain was about two feet.

2 feet times 97 steps times 60 minutes, meant I was hiking at about 11, 640 feet per hour. How many feet are in a mile? 5,280 - so there are 10,560 in two miles, and I was doing about 10% more than that. In other words, I was walking at about 2.2 miles per hour. How long to go 3.5 miles? An hour for the first 2.2 miles, add half of that (1.1 miles) in half of an hour, and the last .2 miles in about six minutes, so a total of 1 hour, 36 minutes.

It was 8:25 A.M., so I added an hour and 36 minutes to that. I was due to arrive at the trail junction at 10:01. When I stopped for a few minutes, I just added those few minutes to my projected arrival time, which then was 10:05. Allowing for ten minutes either way (this is not a perfect science), I knew to start watching closely for the trail at 9:55, and I knew that if I didn't see it by 10:15, I had probably missed it. As it turns out, I was there within a few minutes of the time I calculated.

Ultralight Backpacking Quick Tips

You may have seen the scene in the movie "The Edge," where Anthony Hopkin's character rubs a needle on silk to magnetize it, and makes a compass out of it. Well, it not only works, but I have done it without floating the needle on a leaf. Cradled in a couple pieces of thread, a magnetized needle can be slowly lowered onto the surface of a cup of water, and will actually float there due to the surface-tension. Drop the ends of the thread and the needle will turn to align north-south.

Hiking high in the mountains can make you very hot. There are often snow banks that persist through summer above 12,000 feet, so why not use them to cool off. Rub that snow on your arms and put some on your head. The real point here is to lessen your need to sweat, so you can make your drinking water last longer.

If you really must carry a bowl (I eat from the pan), use a plastic margarine tub. They are lighter than anything you can buy from a backpacking gear supplier.

Easier Backpacking Math

Forget how many feet are in a mile. Put the calculator away (actually I do all the math in my head - it makes the miles fly by). Just learn approximately how fast you hike in various terrains. This really is a useful for planning, and for locating yourself on the map.

The next time you hike a known-distance, see how long it took you and do that little bit of math to figure your walking speed. If you know that on level ground you are walking 2.5 miles per hour, you can safely figure it will take you 4 hours (not counting breaks) to hike to that lake which is 10 miles away. If you have hiked for two and a half hours, you can figure roughly where you are on the map: 6.25 miles towards the lake from where you started.

Other little backpacking math facts:

- Hiking up mountain trails, you are unlikely to gain more than 1,500 feet in elevation per hour. 1,000 feet per hour is closer to the average for most people.

- The temperature will normally be about 3 degrees cooler for each 1,000 feet higher that you go. In other words, if the forecast for the nearest town calls for nighttime low of 45 degrees, but you'll be 5,000 feet higher than that town, expect a low of 30 degrees.

- For each 1,000 feet of elevation above sea level, the boiling point of water is about 1.8 degrees less. It is only 194 degrees Fahrenheit at 10,000 feet, for example, so you may want to boil that water a bit longer to kill any bacteria.

- Army studies found that a pound of weight on your feet is the equivalent of five pounds on your back, in terms of energy output. Get those lighter boots or hiking shoes!

Key Points

1. Knowing how many feet are in a mile and doing a bit of math can help you plan and navigate.

2. There are easier ways to use a bit of math than my mental gymnastics.

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Chapter Forty-One

Better Off Alone?

A personal essay on being alone in the wilderness.

Are you better off alone in the wilderness? Only you can answer that. I can say that sitting on top of a mountain or walking through an empty valley is an entirely different experience when I am alone. It is both more beautiful and perhaps also more melancholy than it could ever be with another.

Backpack alone in the wilderness and you begin to realize how entirely indifferent nature is to you. This trail or that one - it doesn't matter. You might stay warm or get cold, live or die. The sun rises and then sets. It may take away your chills or burn your skin. Nature is without intention. This is a part of its beauty.

There is a lot of food in the mountains. I once ate my fill of currants at 13,000 feet in the Sierra Nevada of California. Trout scattered as I walked by small lakes, waiting to be caught if I needed a meal.

The sun warmed me in the morning, the moon lit my way on night hikes, and I took naps on soft grass in the afternoons. A misstep here or there, however, and I could have fallen a thousand feet. Lightning might have struck me down, or rain might have soaked me and allowed the night air to freeze me. I pay more attention when I am alone in the wilderness.

Is nature malicious? No. It is not benevolent either. It just is what it is. When I'm by myself, I become very aware of my surroundings. I am aware of the clouds forming in the sky, of any little pain in my foot or shoulder - but it is an awareness without worry.

This awareness is present when I am awestruck by the brilliance of a turquoise lake nestled beneath fields of summer snow, in a hanging valley. This scenery is outside my control or comprehension. I watch for a moment and nothing happens, but it is clear that rocks have tumbled into the lake a thousand times. Here, things happen on a time scale unknown to my senses or experience. I just look in wonder, thought itself stops, and I am in a peaceful state of mind - one that doesn't seem possible in a group.

To experience its beauty in this way, I need to be alone. At times there is a feeling of loneliness. I want to share the experience with others. However, the most I really can do is share the view. Being alone is part of the experience.

Ultralight Backpacking Quick Tips

Knowing a few wild berries you can eat can isn't just about potential survival situations. It also means you can have delicious healthy snacks and a good excuse for a break when hiking. Here are some of the wild foods we ate on one day hike in Glacier National Park: Blueberries... Service Berries... Rose Hips... Blackberries... High Bush Cranberries... Strawberries... Raspberries... Thimbleberries... Currants.

Pitching your tent in the right place can mean staying much warmer. Cold settles into valleys and cold winds blow up on the hilltops and mountain tundra. The best locations then, are often somewhere in between - as long as you can find a level spot to camp.

A small piece of Tyvek or plastic can make a nice lightweight mat outside your tent door. It makes it easier to put on shoes without getting dirt in the tent, and provides a place to cook if you are careful.

Better Off Alone - Practical Considerations

I don't believe I am better off alone, and I don't backpack alone because I want to. I would prefer both trips alone and trips with others - they both have their good points. However, it's much easier to plan a trip alone. It's difficult to get two or more friends to schedule time off work on the same dates. Often, they can't take enough time in any case.

There personal backpacking style differences too. I like to go lightweight and cheap. Taking a plane to a backpacking destination, as some of my friends would do, is too expensive. I could take three trips for the cost of one expensive one. As much as I would love the company, I'm not willing to give up those other two trips.

Unlike myself, you may find the camaraderie the most important part of a backpacking trip. In that case you are not better off alone. Even if you share my taste for cheap adventure, you may value that one trip with friends more than three alone.

One final point: Most backpackers don't fully consider the freedom that comes from being alone. Even the most compatible individuals will not need breaks at the same time, be hungry at the same time, want to do the same things or hike the same distance. When you are alone in the wilderness, there is a natural rhythm and freedom that can never be there when several people's needs have to be balanced.

Note: If you plan to spend any time alone in the wilderness, it becomes even more important to have at least some basic wilderness survival knowledge. Review the *Ultralight Backpacking Quick Tips* found throughout this book, and visit *The Ultralight Backpacking Site* for the *Wilderness Survival Guide*: http://www.the-ultralight-site.com/wilderness-survival-guide.html

Key Points

1. Only you can say if you are better off alone when backpacking.

2. There are clear advantages to both hiking in a group and alone.

3. If you do travel the wilderness alone, you should learn some basic survival skills.

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Chapter Forty-Two

Full Moon Hiking

Full moon hiking, in this case, does not mean hiking with your pants off. This chapter is about hiking at night, using the light of the moon. Many years ago, I discovered that if I planned my backpacking trips to coincide with a full moon, I could hike at night. Why would you want to do this? Two primary reasons: the experience and the practicality.

Full Moon Hiking - The Experience

There is adventure and mystery to hiking by moonlight. My first time doing this on a longer backpacking trip was in the Sierra Nevadas. There were no clouds at all, so I slept under the stars each night until the cold woke me up. Then I easily hiked through night by moonlight. On the fourth night I arose at 3:30 AM and hiked to the top of Mount Whitney, arriving just before the sun rose. I was the only person there (150 people would arrive later).

Once, hiking by moonlight on isolated beaches in the Upper Peninsula of Michigan I saw many animal tracks in the wet sand at the water's edge. They included fresh black bear tracks. Bears in this area are not normally dangerous, but it keeps your senses tuned in when you are reminded that there are eyes in the woods watching your every move - and none of them are human.

Lakes and rivers reflect the moon, owls silently swoop by you, and animals move in the bushes as you pass. In the shadows, unseen creatures are hiding, but you walk on by, leaving these little mysteries unsolved. The rocks and the trees take on a different appearance at night. Full moon hiking is a unique and beautiful experience.

Ultralight Backpacking Quick Tips

Want to start a fire in a cold climate? Look for sap oozing out of pine, spruce and fir trees. This can be broken off in chunks if frozen, or scraped off with a stick. It burns for quite a while, even when wet, making it excellent for fire starting.

Run out of aspirin? Cover the bottom of a cup with shredded willow bark, and make tea with it. Allow it to steep for a few minutes before you drink it. Willow bark contains salicin, closely related to salacylic acid, which is used to make aspirin. You can also try chewing on a few balsam poplar buds, which also may have some salicin in them.

Frozen water bottles can be a problem when backpacking in winter. Unless you are getting cold, try carrying your water bottle inside your clothing somewhere. Otherwise, at least pack it deep inside your backpack (top screwed on tight) where it will be less likely to freeze.

Full Moon Hiking - The Practical Aspects

When I hiked by moonlight in in the Sierra Nevadas, I usually was asleep by nine or ten in the evening. Then I got up around three in the morning and hiked the rest of the night. By moving during the coldest part of the night, I stayed warm. You could do okay with a lighter sleeping bag by using this strategy.

There wasn't a cloud in the sky for five days, so I slept without even setting up my tarp every night. This made packing up in the night/morning very quick. Every afternoon I took a leisurely nap in the sun to catch up on sleep. Breaking up the hiking like this seemed to make for easy days.

At night there are never other people on the trail. Crowded trails in places like Yosemite National Park, or in the Smoky Mountains, could be avoided by hiking by moonlight. It is very peaceful to have the trails and whole mountain valleys to yourself. Even with a full moon, however, it can be dark in the woods. This strategy may be best suited to above tree line and beach hikes.

You can hike a lot of miles at night, partly because you don't have any problems of over-heating. With a full moon, or within three days before or after, the moonlight is more than bright enough for hiking in open terrain. In thicker forests, you may need a flashlight at times.

If you decide to try night hiking, plan it so the full moon will be right in the middle of your trip. This way you get the maximum amount of moonlight. Check a weather service online and note the time that the moon will be rising each night. If you start out an hour after moonrise you'll have enough light to hike, unless there are too many clouds - something else you should check the forecast for.

Key Points

1. The full moon provides enough light for hiking in open terrain.

2. Hiking by moonlight is a unique experience.

3. Night hiking also has practical advantages.

4. Plan for a trip with the full moon in the middle, and note the times for moonrise.

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Chapter Forty-Three

Leave No Trace

The "leave no trace" philosophy has developed to an unrealistic and extreme state. First of all, it isn't actually possible to leave no trace when you backpack. Secondly, there isn't any reason we can't leave traces just like every other animal out there. Humans have been a part of the environment for many tens of thousands of years. We do not need to enter the wilderness like alien visitors.

I am sitting here reading a book on "Leave No Trace" practices. It starts by tracing the history of the idea, and you can see why this philosophy was needed. Campers used to poop next to streams and lakes, tear open fragile tundra to prepare a tent site, and leave piles of garbage behind. Trees were

stripped of branches to make balsam bough-beds, and for fires.

Something needed to change, especially once many more people started using the wilderness. So the idea of "taking nothing but photos and leaving nothing but footprints" started to spread. This was fortunate. However, I think it is unfortunate that it has reached an extreme position in many circles.

For example, many "wilderness ethicists" now say that campfires are bad. While it is clear that a fire can damage some sensitive areas, there is no evidence that a fire on the beach below the high water line does any real damage to the environment. It also depends on the size of the fire, and the number of backpackers frequenting an area, doesn't it?

Below are some "rules" I have pulled out of various books and articles on wilderness ethics and minimal-impact backpacking, along with my response:

The Extreme Leave-No-Trace Philosophy Says

The Rule: Don't use toilet paper, or pack it out if you do.

Common Sense: What study shows that toilet paper is harming the environment? Anyone who has had their yard "papered" by teenagers knows how fast toilet paper starts to break down when the rain comes. Use unscented toilet paper and bury it with your excrement.

The Rule: Camp at least 200 feet from lakes and streams.

Common Sense: Supposedly you will pollute the water if you are close to it. Doesn't this depend on what you are doing, how big the body of water is, and how many people regularly stay there? If there is obvious damage, don't add to it, but if it looks like less than one backpacker a year visits the lake, don't worry too much if you are sleeping near it.

The Rule: Take nothing.

Common Sense: If every person who visits the wilderness were to take a souvenir rock home, well, you wouldn't notice the difference. I'm not advocating picking all the wildflowers or demolishing the wild onion patches, but taking the occasional rock or shell, or dead branch for a walking stick isn't really going to hurt much.

The Rule: Pack out all food wastes - even crumbs that fall to the ground.

Common Sense: Gimme a break! Humans and other animals have been dropping crumbs from their dinner for ages. Don't dump half a pan of noodles next to the tent where it is ugly and attracts animals, but don't worry if a few of your sunflower seeds or corn chips escape. (By the way, I am not making these up. I just read a description of how to strain your camp dishwater - using a strainer brought for this purpose - so you can pack up and carry out any food particles that are in it.)

Ultralight Backpacking Quick Tips

Running for the bushes? Tea made from the roots of blackberries, raspberries and their relatives can stop diarrhea. Fill the bottom of a cup with the cleaned and shredded roots and pour boiling water over them. Steep for five minutes before drinking.

Lost your pack? A simple way of making a backpack is to use a jacket, if it is warm enough to get by without wearing it. Zip it up, cinch the bottom shut if it has a drawstring (or pin it shut), and tie the ends of the sleeves to each other. You can then carry things in it by slinging it across your body diagonally, switching shoulders from time to time.

Want an ultralight pillow? Use a heavy-duty ziplock bag filled (not too full) with air. Put it inside a sweater or something else soft for comfort.

Leave No Trace Or Use Common Sense?

The leave-no-trace crowd is not all a bunch of extremists. Unfortunately, the extremists tend to alienate uninformed backpackers and hikers, who need really do need to clean up their ways. There are some common sense ethical guidelines to follow if you want to preserve the wilderness and preserve the wilderness experience for future human visitors. They include:

- Keep your poop and food and soap (even biodegradable ones) away from water. Contamination of water really is a problem in most wilderness areas now.

- Don't leave garbage behind.

- Keep fires small. Use only dead and down wood. Have them only where they are allowed. Put them completely out. Have them in existing fire rings if available.

- Don't harass or feed animals. Feeding attracts them to humans. This is generally bad for their health.

- Avoid the use of soap and shampoo. These really do alter the nature of lakes and streams.

- In popular areas, camp in well worn areas, to concentrate use. In more pristine areas, disperse the impact by camping where no one has before.

- You may not avoid leaving a trace, but leave the wilderness looking the same as you found it.

- Use outhouses if they are available. This concentrates the impact of human waste in a controlled way.

- In lakes of a few acres or more, and streams, swimming and bathing is okay. Even washing your shirt out - without soap - shouldn't do any harm.

- Don't let your dog poop in water, and bury his wastes.

- Stay on trails in heavily used areas. This prevents ugly and environmentally unhealthy erosion.

- Pay attention to any special rules or postings for an area. Sometimes an area has a particular problem that is ruining part of its beauty, like cutting across switchbacks in a trail, or carrying foreign and harmful creatures on your boots from one lake to another.

Basically, if you value the wilderness and your experience backpacking in it, you want to approach this subject from two perspectives:

1. Use a wilderness area in such a way that, given the number of other people using it, it can sustain such use forever without long-term damage to the environment.

2. Use a wilderness area in such a way that the next hikers will have the opportunity to have the same experience. In other words, they won't know you were there.

Leave no trace or leave mostly invisible and harmless traces - that makes sense. In other words, whatever the "rules" may say, the number one rule is to think.

Key Points

1. Leave no trace or at least leave unnoticeable and harmless traces.

2. The "rules" have to take into account the fragility of the area, and the amount of human use.

3. The two basic approaches: Don't ruin the wilderness and don't ruin the experience for others.

4. The most basic rule: Think!

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Chapter Forty-Four

Backpacking Gear Ideas

This chapter is about backpacking gear that doesn't exist. It is about gear I would like try once it is invented. Feel free to take any of the ideas here and run with them. These are just ideas, and there are no patents on ideas (you have to actually design and make it to patent it).

The Swamp Cooler Shirt

This is for hot desert hiking, because it requires dry air to work. Background: You may have learned that soaking your shirt in a stream and wearing it wet is a great way to keep cool in the desert. This uses the principle of the cooling effect of evaporation.

Of course, if you have tried this, you have noticed that twenty minutes later you are far from the stream and the shirt is dry. What we need to invent, then, is a shirt that has some kind of water bags attached. Once they are filled, they slowly leak or drip the water into or onto the fabric of the shirt, hopefully keeping you cool for hours.

Solid Fuel Fire Starters

The design? Just take those army fuel sticks, or a smaller version of them, and add a strike-anywhere match head. You have an instant strike-anywhere fire starter, something like a small emergency flare

Weightless Backpacking Game Boards

Simply print a jacket, tent floor or one side of a backpack with a chess/checkers board, and you have a carry-along game that adds no extra weight to your backpack. Use it when you have to spend hours in the tent waiting out the rain. If you don't want the weight of pieces to carry, use stones or pine cones as checkers.

Underwear Swimsuit

Just combine the comfort of underwear with the styling of a swim suit. Keep it lightweight, of course. Now you don't have to embarrass yourself skinny-dipping in popular backpacking areas.

Lightweight Backpack

I once tied a large duffel bag to an old aluminum backpack frame. The whole thing weighed less than two pounds - including heavily padded shoulder straps and hip belt. Let me repeat: a tough, exterior-frame, full suspension backpack that weighs two pounds!

Why are there no similar packs for sale that are this light? Simply because it hasn't been done yet. The idea for this innovation is truly simple. You just need to forget all the extras, and have a large sack attached to a light frame.

Sleeping Pad Bivy Sack

This would be a sleeping bag pad that is covered. It would be lighter than carrying a bivy sack and a sleeping bag pad - less material for the bivy sack, since it wouldn't have to go under the pad. It could roll up like many pads do.

You could also incorporate a sleeping bag into it too. Put the insulation primarily on top, since it is normally crushed underneath, making it of little insulating value. Perhaps the whole contraption could be under two pounds for summer use, and under four pounds for high-altitude climbers.

Mini Velcro Sleeping Pads

Sleeping bag pads cushion you and insulate you from the cold ground. However, they only do this at the points of contact. These probably amount to less than 20% of surface area of the pad. Basically, the rest of the pad is "unused" and is therefore extra weight to carry.

To resolve this problem we need small closed-cell pads that attach to clothing at the hips, shoulders, knees, etc. These would be just a few inches wide. Velcro might work for attaching, provided that the total weight of the system was under the 10 ounces or so that closed-cell foam pads normally weigh.

Mesh Backpack

What would the advantages be of an all-mesh backpack? It would be light, even after accounting for six or seven plastic bags to keep the contents dry and organized. You also could see the contents, saving you time and trouble when looking for things. My guess is that a nylon mesh 3500 cubic inch capacity backpack could be made that weighs just ten ounces.

Ultralight Backpacking Quick Tips

Air condition your tent. If the day is dry and hot, wet any large piece of cloth in the nearest stream and lay it over the roof of your tent. The evaporation can cool the interior of the tent by as much as ten degrees (set the tent in the shade, of course). Just be sure that if you are using a shirt or other clothing that you'll be needing, to allow enough time before dark for it to dry completely.

Lost and hungry? In many mountain streams you can see the trout, but it's hard to catch them. Try a simple fish trap. Pound sticks into the stream bottom, and weave plant stems into them to make walls that water can go through, but not fish. Create a small corral, with a narrowing opening you can chase the fish into. Once they are there you can spear them or possibly just flip them onto the stream bank with your hands.

If you carry hand sanitizer when backpacking (easier than washing), it can be used as a fire starter too. They are normally at least 70% alcohol, and burn easily.

Inflatable-Pole Tent

Instead of tent poles, this tent would have two inflatable sleeves that criss-cross over the top of its dome-shaped roof. For faster easier set up in the rain, you would be able to inflate them from the inside. Perhaps rigidity could be insufficient for windy nights (and punctures could be a problem too), but it's worth a try.

Inflatable Backpack

Backpackers with frame-less backpacks often put a folded sleeping pad in the pack, against their backs. This provides some cushioning and a "frame" of sorts to help support the load. Why not just have the part of the pack that rests against the user's back inflate.

You could use the same technology as the lightweight self-inflating sleeping bag pads. Done right, it should only add only four ounces or so to the weight of the pack. The backpack could then also double as a foot-bag/pad for sleeping.

Rain Cape Tarp

This would be not quite a poncho, but a tarp that simply has a chin strap and a few velcro attachments down one side, so it could be used as a "rain cape." It should be cheap and simple to manufacture. Of course there are already rain ponchos that double as tarps.

This one would be easier to actually use as a tarp. It would also be large enough to easily cover you and your backpack. If you have ever held a rectangular tarp around you to keep the rain off, you get the general idea.

Wax Paper Water Container

The idea behind this possible invention is to have a disposable water container for those long hikes in the desert when you need to carry extra water. Once you have used the water, you have the option of using the container as a good fire starter, thus eliminating its weight from your pack. These would be something like existing waxed milk and orange juice cartons.

Water Bag Pillow

When I need to carry a lot of water I have used the plastic bladders from boxed wine. They are very strong. I also inflate the bag with air to use it as a pillow. To market something like this as a water container and pillow, it would need a soft covering of some sort.

Wax Paper Food Containers

The idea here is to market backpacking food in wax-paper packaging, instead of plastic. These packages then double as fire-starters. Wax paper will usually burn even when wet, making these useful in an emergency.

Jacket Pack-It

The idea here is a jacket that is also a backpack. The back of the jacket would be the outside back-wall of the backpack. In other words, when wearing the jacket, the pack would be inside it. The jacket part could be folded out of the way, and the backpack would have shoulder straps.

The jacket part, though, when worn, would help stabilize the pack. With the pack effectively inside the jacket, it would be easier to push through heavy brush, because it wouldn't catch on things as easily. The effect would be something like wearing a large jacket over a backpack, but with the weight-savings and stability that come from combining them (the jacket and one side of the pack would share a common panel of material).

Your Own Backpacking Gear Ideas

As you may have noticed in reading through this book, I like to play with new ideas, like my plastic bivy-sack, and my four-ounce insulating vest. You can do the same, and maybe even invent some useful new backpacking gear. Just look for ways to:

- Modify existing gear.

- Reduce the weight of existing gear.

- Combine two things in one.

- Design new systems or techniques for backpacking.

- Apply new materials to making backpacking equipment.

- Take new ideas from other products and apply them to hiking gear and clothing.

Key Points

1. There is still a lot of backpacking gear to be invented.

2. You can invent some of it.

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Chapter Forty-Five

More Ultralight Backpacking Quick Tips

This is a collection of some more backpacking tips and survival techniques for ultralight backpackers - or any other travelers in the wilderness.

- Be careful with backpack stabilizing straps that cross your chest. These are supposed to keep the pack from sliding around and throwing you off balance, but if they are too tight, they don't let your chest expand enough when breathing. See if you breath more fully or easily when these are loosened.

- If you twist an ankle badly or injure your leg, you may need to make a crutch. Find a branch or trunk of a small tree with a "y" in it. Cut it a few inches above each end of the "y" (this will be where you rest your armpit). It is better to cut the crutch too long,and then cut it to size once you can work with it and test it.

- Lost and in danger? Want to be a survivor? Read some survival stories before you are in this situation. Recalling true stories about how others survived can be very motivating in an emergency situation. Help others in the group by telling them the stories.

- Get dental work done before taking a long backpacking trip. An annoying toothache can become an unbearable pain within a couple days. That can ruin the trip for everyone.

- If you are short on water and unsure when you'll have more, avoid high-protein foods. They take more water to digest. Eat the crackers and save the beef jerky for after you find water.

- Wash your hands often. You can go weeks without washing your hair with no real danger, but hands transmit bacteria and viruses to yourself and others. Soap isn't necessary, but scrubbing with something helps. Use sand or spruce needles.

- To make an emergency stretcher, cut two poles about eight feet long. Use saplings that are about two to three inches thick. Lay them about twenty inches apart on a blanket or tarp, and fold the sides of the blanket over the top. They weight/friction of the patient should hold the blanket in place, but you may want to pin it or tie it together for long carries.

- If you have an external-frame backpack, be sure to different adjustments on it. Some packs let you adjust the spacing between the straps, how high or low the straps are, as well as the usual length and hip belt adjustments. Backpackers often leave these the way they find them, when it might be much more comfortable with a bit of experimentation.

- Yes, it's true that you can start fire using ice and the light of the sun. It just isn't easy. The idea is to mold a piece of clear ice into a lens, using the warmth of your hands. Then you use it like any magnifying glass to concentrate the rays of the sun. Just be careful not to drip on your tinder.

- Bird eggs are often the easiest-to-get high-protein food in a survival situation. I once ate seagull eggs, when stuck on a small rocky island. They weren't bad, and interestingly, they are larger than chicken eggs. Cook bird eggs if possible, and try to leave one egg in the nest, unless it truly a life-or-death situation.

- Just because animals eat a plant doesn't mean it is safe. Squirrels eat mushrooms that are poisonous to humans, and many animals graze on poison ivy. In a survival situation, stick to plants you know, and test new potential food plants carefully - and only as a last resort.

- Backpacking in winter? Remember the army survival guide acronym for cold weather wilderness travel: COLD; Clean clothing; Avoid overheating; Loose, layered clothing; and Dry clothing. This is a recipe for staying warm.

- Winter backpacking can mean using a lot of stove fuel to melt ice and snow for drinking water. To use less fuel, carry a piece of black plastic, like an opened-up garbage bag. Lay out the plastic in the sun and scatter snow on it. The black plastic absorbs the sun's heat and should quickly melt the snow if it is near freezing. Carefully pour the water off. If the snow is clean, you can forego purification.

- Need to cross a large river during your hike? A rain jacket can be used as an improvised flotation device. Tie the sleeve-ends shut, to trap air. Hold the jacket closed so that one sleeve is on each side of you.

- In an iffy situation, start gathering knowledge before there is real trouble. For example, perhaps you lost your compass, but are on a trail and still know which direction is which. At this point you should start noting which sides of hills certain plants grow on, so you can later determine direction if you get more lost.

- To bring a cell phone or not? Sitting on top of mountains here in Colorado, listening to husbands on the phone arguing with their wives - this does seem to diminish the experience. However, they save lives - there is no doubt about it. Turn it off when you start hiking, so the batteries will be fresh if you have an emergency.

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Everything in this book is useless in some situation. Everything in this book is useful in some situation. Every rule is made for a reason, and there is a reason to break every rule. I hope you understand that the most important item you bring backpacking is your mind. Backpacking gear and backpacking knowledge doesn't mean a thing without the mind that puts it to use.

Happy Backpacking!

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Ultralight Backpacking Secrets

(And Wilderness Survival Tips)

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(The End)